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HUNTERS POINT
SSIC NO. 5090.3

Planning Documents Phase III Soil Vapor Extraction Treatability Study

Parcel B

*Hunters Point Naval Shipyard
San Francisco, California*

Contract No. N68711-02-D-8303
Delivery Order CT003
Project No. 02-307.01

Prepared for:



**Southwest Division
Naval Facilities Engineering Command
1220 Pacific Highway
San Diego, California 92132-5190**

Prepared by:



**Innovative
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October 2003

Letter of Transmittal

To: [REDACTED] Company: Southwest Division Naval Facilities Engineering Command 1220 Pacific Highway San Diego, CA 92132-5190	From: Rachel Hess Date: 10/09/03 Project # 02-307.01 Doc No: 02-307.01.0034 Direct Line 925-946-3105
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No.	Copies	Date	Title
1	1	10/09/03	Final Phase III SVE Treatability Study, Building 123, Parcel B, Hunter's Point Naval Shipyard Planning Documents (Health and Safety Plan; Data Management Plan; and, Transportation & Disposal Plan)
2	1	10/09/03	CD of Final Phase III SVE Treatability Study, Building 123, Parcel B, Hunter's Point Naval Shipyard Planning Documents (Health and Safety Plan; Data Management Plan; and, Transportation & Disposal Plan)

Comments:

The attached Final Phase III SVE Treatability Study Planning Documents for Building 123, Parcel B, Hunter's Point Naval Shipyard is provided to you for your use and files.

CC/no attachment:

Ryan Ahlersmeyer (06CHRA), BRAC Operations, SWDIV, 1230 Columbia St., Ste 1100, San Diego, CA, 92101

Introduction

Innovative Technical Solutions, Inc. (ITSI) has been contracted to conduct the Phase III Soil Vapor Extraction (SVE) Treatability Study at Building 123, IR-10, Parcel B, Hunters Point Shipyard located in San Francisco, California (Figure 1). Work will be performed under the ITSI's Northern California Environmental Multiple Awards Contract (EMAC) Number N68711-02-D-8303, Task Order CTO 003.

Four planning documents have been prepared and present the procedures and summarize the activities that ITSI will implement to the Phase III SVE Treatability Study at Building 123 in Parcel B.

A Workplan describing the design, construction and operation of an SVE system at Building 123. The Workplan includes the Facility Design and Sampling and Analyses Plan (SAP). The SAP consists of a Field Sampling Plan (FSP) which describes sampling and decontamination procedures, and a Quality Assurance Project Plan (QAPP) which present quality assurance/quality control procedures, analytical methods, and Data Quality Objectives (DQOs).

The Site-Specific Health and Safety Plan (HSP) presents the procedures that will be implemented during site activities to protect on-site personnel and the surrounding communities from the physical, chemical, and/or biological hazards associated with system installation, sampling, maintenance and operation at Building 123.

The Data Management Plan (DMP) presents the pathway and summarizes the procedures that will be used to validate and manage the data generated during and subsequent to the sampling event(s).

The Transportation and Disposal Plan (TDP) addresses the environmental mitigation procedures for investigation-derived wastes (IDW) generated during the sampling activities.

The Workplan is presented as a separate document. The HSP, DMP, and TDP are presented in this document as Appendices A, B, and C, respectively. These plans were prepared based with following guidance documents: the Statement of Work dated June 4, 2003 (U.S. Navy [Navy]), and on the results of the previous SVE treatability studies (Phase II SVE Treatability Study Report [IT Corporation {IT}, 2002] and the Soil Vapor Extraction Confirmation Study Report [Tetra Tech EM, Inc. {TtEMI}, 2003]).

Background

Based on the results of previous investigations and SVE treatability studies, TCE is present in soil under Building 123 at concentrations that are above the HPS risk-based action levels for volatilization to indoor air. The results of the Phase II SVE Treatability Study and SVE Confirmation Study suggest that SVE is an applicable technology for the removal of TCE from the vadose soils beneath Building 123 (IT, 2002 and TtEMI, 2003). The remediation approach is to expand the existing network of SVE wells in areas where TCE contamination in vadose soil and in soil vapor has been identified during previous investigations and treatability studies (TtEMI, 2003). The existing well field, which consists of 14 SVE wells and 18 (nine nested pairs) vapor monitoring (VM) points, will be expanded by installing nine additional SVE wells and five additional nested pairs of VM points. When complete, therefore, the Phase III Treatability Study system will consist of a total of 23 SVE wells and 28 VM wells (14 nested pairs). The SVE system will be operated for a minimum of 6 months to evaluate the effectiveness of the expanded system in reducing TCE to below risk-based screening levels. With agency approval, the Navy will consider operating the expanded system until concentrations of TCE in soil have been reduced to below risk-based action levels, or until the SVE technology reaches its feasibility limit.

References

IT Corporation (IT), 2002. "Phase II Soil Vapor Extraction Treatability Study Report, Building 123, IR-10, Parcel B, Hunters Point Shipyard, San Francisco, California," February 14.

TtEMI, 2003. "Internal Final Soil Vapor Extraction Confirmation Study, Building 123, Installation Restoration Site 10, Parcel B, Hunters Point Shipyard, San Francisco, California." April 10.

HEALTH AND SAFETY PLAN

**Phase III Soil Vapor Extraction Treatability Study at Parcel B
Hunters Point Shipyard, San Francisco, California**

**Contract Number N68711-02-D-8303
Delivery Order Number CTO 003**

Prepared for:

Department of the Navy
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Figure 2	Route to Hospital
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Attachment 1	Safety Field Forms
Attachment 2	Standard Operating Procedures for Sample Handling
Attachment 3	Standard Operating Procedures for Spill Response
Attachment 4	Chemical Safety Fact Sheets

ACRONYMS AND ABBREVIATIONS

ACGIH	American Conference of Governmental Industrial Hygienists
BPM	beats per minute
BRAC	Base Realignment and Closure
Cal-OSHA	California Occupational Safety and Health Administration
CCR	California Code of Regulations
CFR	Code of Federal Regulations
CIH	Certified Industrial Hygienist
DOT	Department of Transportation
EPA	U.S. Environmental Protection Agency
EZ	exclusion zone
GAC	granular-activated carbon
GFCI	ground-fault circuit interrupter
HPS	Hunters Point Shipyard
HSO	Health and Safety Officer
IDW	investigation-derived waste
IIPP	Injury and Illness Prevention Program
ITSI	Innovative Technical Solutions, Inc.
MK	Morrison Knudsen
MSDS	material safety data sheets
O&M	operation and maintenance
OSHA	Occupational Safety and Health Administration
PEL	permissible exposure limit
PID	photoionization detector
PM	Project Manager
PPE	personal protective equipment
ppm	parts per million

ACRONYMS AND ABBREVIATIONS (Continued)

ROD	Record of Decision
SAP	Sampling and Analysis Plan
SPF	sun protection factor
SSHSP	Site-Specific Health and Safety Plan
SVE	soil vapor extraction
TCE	trichloroethene
TS	Treatability Study
TtEMI	Tetra Tech EM Inc.
VM	vapor monitoring
VOC	volatile organic compound

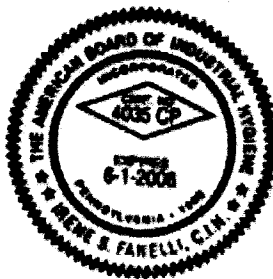
This Health and Safety Plan addresses the activities to be carried out during the Phase III Soil Vapor Extraction Treatability Study at the Hunters Point Naval Shipyard, Parcel B, in San Francisco, California. This plan has been prepared in accordance with 8 CCR 5192 and other applicable regulations, and good industrial hygiene practice.

This site-specific plan is intended to apply to the project activities at the above site only, and must not be extrapolated to other substances, activities, or project locations without modification to address the specific hazards associated with those substances, activities, locations, and/or any other specific regulatory requirements.

CERTIFICATION OF HAZARD ASSESSMENT

A Hazard Assessment in accordance with 29 CFR 1910.132 has been made to determine the likelihood of excessive exposure to site chemical contaminants. Given the scope of work for the project, the concentrations, the degree of potential for exposure to the site materials and prior experience on other sites with similar conditions, there is no expectation that overexposure will occur.


Irene S. Fanelli, CIH



9/30/03

Date

1.0 INTRODUCTION

This Site-Specific Health and Safety Plan (SSHSP) addresses the activities to be carried out during the Phase III Soil Vapor Extraction (SVE) Treatability Study (TS) at the Hunters Point Shipyard (HPS), Parcel B, in San Francisco, California. The plan has been prepared in accordance with Code of Federal Regulations (CFR) Title 29, Part 1910.120, California Code of Regulations (CCR) Title 8, Section 5192, other applicable regulations, and good industrial hygiene practice.

This SSHSP is intended as a practical approach to site activities in light of the potential occupational and public health hazards. Based upon site history, anticipated chemicals of concern, and planned activities, a "Level D" site will be maintained. Level D consists of the use of hard hats, safety glasses, steel-toed boots, and gloves, as appropriate, for personal protection. As work activities progress, site conditions may change; this SSHSP outlines the procedures necessary to ensure a safe working environment under the actual conditions which may be encountered. This SSHSP may be upgraded or downgraded in the field, as appropriate, in light of actual site conditions. Consultation with the corporate Certified Industrial Hygienist (CIH) will take place prior to implementation of such changes.

This SSHSP covers all contractors and subcontractors involved in site activities. It serves as a minimum guideline for protective measures. Individual contractors may elect to implement more stringent measures for their own workers. Worker health and safety is the responsibility of every employer. Each contractor will provide health and safety equipment for its employees. Each contractor and their staff will be responsible for the health and safety of all members of their work force. Innovative Technical Solutions, Inc. (ITSI) will ensure compliance with all contractual health and safety requirements.

All site workers directly involved in site operations associated with potentially contaminated media (soil, groundwater, soil vapor, and/or investigation-derived waste [IDW]) will be appropriately trained and certified in accordance with California Occupational Safety and Health Administration (Cal-OSHA) requirements for hazardous waste operations (8 CCR 5192).

As field operations proceed, it is anticipated that soil cuttings derived from installing SVE wells and decontamination rinse water will be containerized on-site in separate 55-gallon drums pending off-site disposal for soil and approval of discharge from the San Francisco Public Utilities Commission for wastewater. If discharge criteria are not met, the liquid wastes will be disposed of at a licensed waste disposal facility under the appropriate documentation (i.e. bill of lading or manifest). In addition, appropriate disposal or regeneration of spent carbon from granular-activated carbon (GAC) units used in the TS will be arranged. Personal protective equipment (PPE) and miscellaneous materials from sampling such as paper towels, will be placed in garbage bags, sealed, and disposed of in on-site trash receptacles. If site conditions continue to result in potential employee exposures to the site contaminants, only properly trained and certified personnel will be utilized until the area is confirmed to present non-exposure conditions.

All on-site personnel, regulatory agency personnel, and visitors are expected to be familiar with, and comply with the provisions of this SSHSP. In addition, site workers and visitors shall sign the acknowledgment form provided in Attachment 1.

This site-specific HSP is designed as part of an overall Corporate Health and Safety Program or Injury and Illness Prevention Program (IIPP) as specified in 8 CCR 5192 and 8 CCR 3203, respectively. It is specifically intended that this SSHSP supplements any corporate policies and procedures set forth for the various employers involved at the site. If, in any instance, there is a conflict between this SSHSP and any employer's IIPP, the more stringent requirement shall apply to the work.

2.0 SITE BACKGROUND, SITE DESCRIPTION AND SITE ACTIVITIES

The following subsections summarize the site background, description, and planned activities.

2.1 SITE BACKGROUND

The Navy took over ship repair facilities and obtained ownership of the Hunters Point Naval Shipyard in 1940. HPS was deactivated by the Navy in 1974. In 1976, HPS was leased to Triple A

Machine Shop Corporation, a private ship repair company. The Triple A lease ended in June 1986, and the Navy resumed occupancy; Triple A vacated the site in March 1987. In 1989, based on environmental conditions at HPS resulting from industrial activities conducted by both the Navy and Triple A shipyard, HPS was placed on the National Priorities List and was identified as a Superfund site by the U.S. Environmental Protection Agency (EPA). In 1991, the U.S. Congress called for the closure of HPS, in accordance with the Federal Base Realignment and Closure (BRAC) Program. In 1992, HPS was divided into parcels A, B, C, D, and E, based on the re-use plan and the anticipated order in which portions of the facility would be transferred to the city of San Francisco. This SSHSP covers upcoming Phase III SVE TS field activities planned in Parcel B.

2.2 SITE DESCRIPTION

When active, Parcel B had been used primarily to house office and commercial buildings and warehouses. The Navy also conducted industrial activities at Parcel B, including fuel storage, and distribution, sandblasting and painting, machining, acid mixing, and metal fabrication. HPS was designated for closure under the BRAC program with the intent of transferring the property and facilities to neighboring communities as expeditiously as possible and with the minimal adverse effect on the local economy.

2.3 SITE ACTIVITIES

In order to attain the cleanup goals established in the Record of Decision (ROD), the Navy is conducting removal actions and confirmation sampling at Parcel B. Remedial actions for Parcel B soil to address potential impacts from past operations are specified in the Final Parcel B Remedial Design Document VI, Confirmation Sampling and Analysis Plan (SAP) (Morrison Knudsen [MK] and Tetra Tech EM Inc. [TtEMI], 1999) and its Amendment (TtEMI, 2001). The Phase III SVE TS is a continuation of the previous Phase I and II studies and is intended to further evaluate the effectiveness of SVE at removing trichloroethene (TCE) and other volatile organic compounds (VOC) from the soil in order to meet the cleanup goals.

This SSHSP and the associated planning documents provide the procedures for conducting the study activities. The fieldwork is currently scheduled to start in November 2003 and operation and maintenance (O&M) of the system is anticipated to continue until demobilization in August 2004 pending regulatory approval of the work plan.

Field activities related to the SVE TS are as follow:

- Field locate and mark proposed well locations
- Conduct utility clearance using geophysical techniques
- Monitor baseline soil vapor at existing SVE and vapor monitoring (VM) wells
- Collect soil vapor samples from five of the existing wells
- Install 9 new SVE and 10 new vapor monitoring (VM) wells to augment the existing network
- Survey well locations
- Collect soil samples during well installation for chemical and geotechnical analysis
- Perform well development and testing
- Construct SVE system
- Perform system O&M for eight months
- Conduct weekly influent soil vapor monitoring and sampling at new wells for the first month of operation
- Conduct monthly influent soil vapor monitoring and sampling at new wells for the remainder of the project
- Perform change-out of carbon units, as needed
- Shut down and demobilize SVE system
- Following system shutdown, monitor rebound soil vapor at SVE and VM wells biweekly for two months
- Collect soil vapor samples from five of the wells (new or previously-existing)
- Transfer and store IDW (soil cuttings and decontamination rinsate).
- Dispose of the IDW.

Sample handling will be conducted in accordance with the standard operating procedure included in Attachment 2.

3.0 KEY PERSONNEL AND RESPONSIBILITIES

Project Manager: Rachel Hess

The Project Manager (PM) for this project, Rachel Hess, will have overall day-to-day responsibility for implementation of the work plan and project coordination with the Navy and project team personnel. Ms. Hess has over 14 years experience working on a wide variety of soil and groundwater investigations, monitoring and remediation projects.

On-Site Project Supervisor/ Health and Safety Officer: Brett Womack

Alternate On-Site Project Supervisor/Health and Safety Officer: Brian Dee

The on-site ITSI Project Supervisor or his alternate will function as the Health and Safety Officer (HSO) for ITSI employees, and is responsible for oversight of the site activities of ITSI employees, including handling of any hazardous materials encountered. He or his designee is directly responsible for implementation of, and compliance of the company's personnel with this SSHSP. Mr. Womack or his alternate, Mr. Dee, will act as the company's competent person and as response coordinator in case of an emergency.

Each contractor or sub-consultant shall designate an HSO for their company's site activities. Each employer's HSO, or their designee, will be responsible for performing any required air monitoring on site for their company's employees, and will be responsible for decision making regarding upgrades in respiratory protection of their employees. They will also be responsible for performing daily inspections of their work sites in order to verify that the health and safety of their workers is protected through compliance with the provisions of this SSHSP.

Certified Industrial Hygienist: Irene S. Fanelli, CIH

The Certified Industrial Hygienist will review and approve this SSHSP, will approve all changes, and will provide support to the Site Supervisors for questions or problems relating to health and safety concerns at the site.

4.0 JOB HAZARD ANALYSIS

The following section presents a discussion of the physical and chemical hazards for this project.

4.1 PHYSICAL HAZARDS

The primary physical hazards potentially associated with the site are expected to include:

1. Physical Hazards
2. Biological Hazards
3. Fire Hazards
4. Cold Stress, Solar Radiation and Heat Stress

Personnel working most directly with the installation, operation, and maintenance of the SVE system will have the greatest chance of encountering these hazards.

4.1.1 Physical hazards

A number of physical hazards will exist at the Hunters Point site:

- Slip, trip, and fall hazards.
- Miscellaneous small equipment hazards such as physical trauma and moving parts.
- Noise
- Material Handling

Good housekeeping will be maintained on site at all times to minimize slip and fall hazards. Debris, supplies, or other materials or equipment that may present a tripping or slipping hazard shall be removed, if possible, or barricaded to prevent potential injury. Although not anticipated for site operations, any personnel who may be exposed to a fall of six feet or greater must have personal fall protection in place as required by the Occupational Safety and Health Administration (OSHA) 29 CFR 1926.

Work will be completed under the required Buddy System. If any worker suffers a fall-related injury while conducting sampling or O&M activities, their work partner will assist the sampler to the support area (if it is safe to move the person), and then assess whether additional help is

needed. If additional help is needed of a non-medical nature, then an attempt will be made to contact other onsite workers for assistance. If medical assistance is needed, emergency medical personnel will be notified.

To mitigate hazards associated with miscellaneous on site equipment, items will be operated in accordance with the manufacturer's recommended safe practices or according to the subcontractor's code of safe work practices. Any portable electrical equipment and associated generator used on site will be inspected to assure the electrical cords' protective covering is intact and the three-prong grounding plug has not been altered. A ground-fault circuit interrupter (GFCI) shall be placed at the end of any extension cords such that the cords plug directly into the GFCI. GFCIs shall be tested daily to assure they are operating properly.

Excessive noise from the on-site sampling truck, drill rig, or SVE system equipment may be expected to occur. Workers will be instructed to utilize hearing protection whenever normal conversation at approximately three feet or arm's length becomes difficult due to work area noise levels. Staff will be trained on the safety hazards related to hearing protection when working in proximity to vehicles or equipment. In addition, staff will be offered the opportunity to wear hearing protection for comfort reasons even if the ambient noise levels are low.

Personnel will be instructed in safe material handling techniques, and will be instructed to use the appropriate protective gear including leather work gloves to prevent abrasions, cuts, and struck-by accidents. Personnel will also be encouraged to request assistance from other site personnel when lifting large, heavy, or awkward objects. Proper lifting methods are detailed below. In addition, steel-toed shoes are required.

A proper method for lifting is:

- Get a good footing;
- Place feet about shoulder width apart;
- Bend your knees to pick up the load. Never bend from the waist;
- Keep your back straight;
- Get a firm hold. Grasp opposite corners of the load, if possible;

- Keep your back as upright as possible;
- Lift gradually by straightening your legs, don't jerk the load;
- Keep the weight as close to your body as possible;
- When changing directions, turn your entire body, including your feet. Don't twist your body or make awkward moves, which force you to be off balance.

4.1.2 Biological hazards

Biological hazards at the site may include:

- Brown Recluse and Black Widow Spiders, ticks, and flying insects.
- Poison oak
- Snakes and rodents (Hantavirus).

Workers will wear proper clothing, including long pants absent of tears to deter insect bites. Pants should be tucked inside work boots. Site personnel should be able to recognize and avoid contact with poison oak. Workers should also be aware that if there is evidence of the presence of rodents, the hazards associated with exposure to Hantavirus may also be present. Site personnel must be warned to avoid direct contact with dead rodents or dried fecal material. If dead rodents or dried fecal material must be removed from the work area, skin and respiratory protection shall be worn. These materials should be picked up using a shovel and placed in a plastic bag which is then sealed. Site personnel will be reminded to watch for and avoid spiders, snakes, or rodents.

4.1.3 Fire Hazards

Appropriate measures will be taken to reduce fire risk through proper monitoring of site activities, good housekeeping and through the maintenance of on-site fire fighting equipment, including a supply of Class ABC fire extinguishers. Fire extinguishers will be maintained in each site work truck and vehicle. Potential flame or spark producing activities in areas of wood debris, dry grass or brush are prohibited.

Vehicles and equipment will contain fire extinguishers, as required by OSHA regulations. ITSI and sub-contractors will locate additional 10-pound Type ABC Fire Extinguishers within the immediate work area, if required, so that the maximum travel distance does not exceed 75 feet.

Gasoline and diesel will not be used as a cleaningsolvent or for any other purpose than to power vehicles and generators.

Fueling of generators **SHALL NOT** be done in the bed of the pickup trucks. The generator must be placed on the ground for fueling. A suitable tray or other containment shall be placed beneath the generator in the event of spill during fueling. Fuel containers shall be constructed of metal. The fuel container shall remain in contact with the fill port of the generator at all times during fueling in order to prevent a fire hazard from static. A 10-pound fire extinguisher shall be within reach during fueling. Fueling of generators shall not occur in areas where combustibles (including tall grass) are present. No smoking or other ignition sources shall be allowed in the area when fueling the generators. Fuel containers shall be completely closed when not in use, and secured to the vehicle if kept in the truck during movement.

Smoking will not be permitted in work areas. Smoking will be permitted in designated areas in the support zone only. Smoking will not be permitted near fuel storage areas or similar potential fire hazards.

In the event of a grass or brush fire, or a fuel fire which requires more than one fire extinguisher, site personnel will immediately notify emergency personnel and evacuate the work area to a safe distance where they can coordinate with emergency personnel. **Site personnel WILL NOT engage in fire fighting activities.**

4.1.4 Electrical Hazards

It is expected that project activities will require work around equipment powered by electricity and/or work around electrical circuits. To protect workers from potentially harmful effects of electrical shock,

only qualified and experienced licensed electricians shall install or work near live electrical circuits unless all guards/shields/covers are in place and approved for use.

In addition, the following safety precautions will be in place:

- Temporary power distribution systems shall be GFCI protected. Flexible power cords passing through areas that would leave them susceptible to damage shall be covered or elevated.
- Power cords are to be UL listed. Power cords must have plugs and insulation that are free of damage. Cords with defects shall be repaired or removed from service.
- Electrical wiring and equipment shall be type listed by UL, Factory Mutual Engineering Corp., or another recognized test or listing agent for the specific application.
- Temporary power lines, switch boxes, receptacle boxed, metal cabinets, and enclosures around equipment shall be marked to indicate the maximum operating voltage.
- Temporary electrical distribution systems and devices shall be checked and accepted for polarity, ground continuity, and ground resistance prior to initial use and prior to use after modification. Ground resistance shall be measured recorded and furnished to the designated authority at the time of installation.

During installation, maintenance, or servicing of electrical equipment or circuits, blocking or breaking the energy path shall be performed in accordance with the procedure below so that electricity cannot flow to cause electric shock.

LOCKOUT PROCEDURE

1. Positively identify and test electrical circuit to be turned off.
2. Turn off over current protective device.
3. Where practicable disconnect circuit wires from load side of over current protective device. If not disconnected, verify line voltage is off using a voltmeter.
4. Place lock on over current protective device so as to render it impossible to turn on.
5. Place tag on lock to indicate name of person placing it, date and time of day tag was installed and estimated time of outage.
6. Reverse steps 1-5 to restore circuit to operation.

4.1.5 Cold Stress, Solar Radiation and Heat Stress

Due to local variability in weather patterns, it is likely that weather conditions varying from cold to hot may be encountered during the field work. Wind and moisture, as well as the lack of shade at the site, may combine with low or high temperatures to create unfavorable working conditions. The HSO will observe the site conditions and, should adverse conditions occur, implement appropriate work/rest regimes to provide for the comfort and safety of project personnel.

In addition, the HSO will routinely check with on-site staff to verify that they are not uncomfortably cold or hot. Simple preventative measures (such as rest breaks, availability of appropriate clothing for warm and cold conditions, hydration, etc.) are anticipated to be adequate. Should heat and cold stress prove to be causing employee discomfort and possible employee health hazards, the HSO will amend this SSHP and will implement other, more stringent procedures.

Cold injury (hypothermia) and impaired ability to work are dangers at low temperatures and when the wind-chill factor is low. If required to help prevent frostbite and hypothermia, cold stress monitoring will be conducted following the 1995-1996 American Conference of Governmental Industrial Hygienists (ACGIH) cold stress standard.

Precautions against cold stress may include the wearing of layers of warm clothing. Proper nutrition in the form of regular meals reduces the chance of cold stress. Outer clothing which will protect against moisture and wind will also decrease the likelihood of cold stress. Workers who may suffer significant symptoms of cold stress will be taken to a warm, dry area and counseled to wear appropriate clothing. If the HSO observes or suspects conditions of significant hypothermia, the affected worker will be taken to the local hospital for treatment.

Solar radiation exposures and sunburn will be minimized by:

- Employees minimizing exposed skin by wearing long-sleeved shirts, hats, UV-rated sunglasses, and gloves.
- Employees will be provided with high sun protection factor (SPF) barrier cream for exposed skin areas.

- Employees will be encouraged to take cover out of direct sunlight when work activities permit.

The following are identified as conditions of Heat Stress:

- Heat Cramps - cramping of muscles usually due to excessive sweating and loss of body salts - most often associated with moderate or strenuous physical activity.
- Heat Rash - a rash produced when working and sweating in hot environments- greatly enhanced by excessive rubbing of clothing or items in direct contact with the skin.
- Heat Exhaustion - Excessive sweating, cool clammy skin, fatigue, weakness, headache, un-coordination, nausea, and/or fainting may occur.
- Heat Stroke - a response to heat characterized by extreme high body temperature and failure of the sweating mechanism. Heat Stroke symptoms include Hot Dry Skin, weak rapid pulse, and mental confusion. Unconsciousness may occur. Heat Stroke is considered an immediate, life-threatening emergency for which medical care is urgently needed. Emergency medical personnel should be called immediately for assistance.

Preventive measures for Heat Stress include:

- Frequent Rest Periods in a shaded area when heat and/or humidity are high.
- Drinking of non-alcoholic fluids will be encouraged, but should be done outside of exclusion zones. Drinking water and electrolyte replacement drinks (i.e. Gatorade) will be provided, as needed.
- Suitable acclimation periods will be provided for workers to gradually establish their resistance to heat stress.
- The use of protective clothing greatly enhances the likelihood of heat stress. When site conditions exceed 70°F, the Safety Officer will monitor the site conditions/work rates, and implement work/rest regimens, if necessary. Personal heat stress monitoring will be implemented as described below, as necessary.

To monitor the workers, measurements will be made of their heart rate, with subsequent adjustments to work schedule:

- Count the wrist pulse during a 30-second period as early as possible in the rest period.

- If the heart rate exceeds 110 beats per minute (BPM) at the beginning of the rest period, shorten the next work cycle by one-third, and keep the rest period at 10 - 15 minutes.
- If the heart rate still exceeds 110 BPM at the next rest period, shorten the next work cycle by one-third and keep the rest period the same.
- If the heart rate still exceeds 110 BPM at the next rest period, shorten the following work cycle by one-third and keep the rest period the same.

4.2 CHEMICAL HAZARDS

Table 3 provides a list of the compounds previously detected and/or potentially present at the site, along with exposure limits, routes of exposure, and symptoms of overexposure. Routes of exposure for site chemicals generally occur through inhalation of vapors or contaminated airborne particulates, or through ingestion due to poor work practices and/or poor personal hygiene practices. Other potential routes of exposure include injection and absorption.

Chemicals known or suspected to be present on site are listed under California's Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65) as chemicals known to the State of California to cause cancer or reproductive harm.

Any exposures to the site contaminants are expected to be minimized through proper work practices, the use of personal protective equipment, ambient air monitoring (and appropriate upgrades to respiratory protection if indicated), and proper personal hygiene. The potential for exposure to the public is considered to be minimal, and the control measures taken will serve to further minimize any exposure. Based upon the results of previous sampling, contaminants of concern have been detected at low, part per million, concentrations. As such, the site contaminants are not expected to pose a significant source of exposure for the field personnel. Since actual concentrations of contaminants in soil samples cannot be anticipated, appropriate PPE will be used at all times when handling soil.

ITSI will bring a number of chemicals to the site for the purposes of performing the field work such as: Sampling truck, isobutylene gas for calibrating instruments, and laboratory-supplied containers with small quantities of sample preservatives.

Isobutylene: This gas is used for calibration of direct-read instruments, and will be brought on site in extremely small quantities (a 1-pound compressed air cylinder). Exposure is through inhalation.

Employee exposure to isobutylene gas is not expected to reach the permissible exposure limit (PEL). Exposures are expected to occur only at low concentrations and only during calibration activities. No specific air monitoring is anticipated for these compressed gases, as the exposure to project staff is expected to be insignificant.

Laboratory Supplied Containers: Some laboratory analytical methods require preservation of samples with hydrochloric acid and nitric acid at low pH at the time of sample collection. The containers with preservatives are usually pre-prepared and provided by the laboratory. Although the quantities of these acid preservatives are small, dermal contact may occur through breakage or accidental splashing. Employee exposure to these preservatives will be minimized by good housekeeping practices to avoid spilling, breaking, or splashing and by utilizing the Level D safety protection required for this project.

Material Safety Data Sheets (MSDS) will be obtained for all materials brought onsite. The MSDS shall be kept in the ITSI office trailer and made available to all site personnel. Chemical safety fact sheets are included in Attachment 4.

5.0 AIR MONITORING PLAN

The following section describes the air monitoring action levels and procedures for approaching and assessing the air around the SVE and VM wells.

5.1 ACTION LEVELS

Based upon existing site chemicals, continuous direct reading air monitoring is not anticipated during project task activities. All site personnel will be advised to be aware of and report any visible or odor indications of the presence of contamination. If site conditions are found to differ from those described in this HSP, the HSO, in conjunction with the consulting CIH, will determine the

extent of personal exposure monitoring necessary during site operations. If it is determined that respiratory protection is required for any activity, action levels and upgrade procedures will be developed as an addendum to this plan.

As a precaution, a photoionization detector (PID) will be used intermittently, as described below, to monitor for the presence of organic vapors (other than methane) in the breathing zone during site operations. Air monitoring will be conducted during: vapor monitoring and sampling well installation and sampling, and routine system O&M.

If monitoring instruments detect 10 parts per million (ppm) or more in the breathing zone for five minutes, work will stop in order to determine appropriate control measures. If control measures are implemented, subcontractors will be required to perform personal exposure monitoring for their own personnel on site when necessary.

During routine O&M activities, a PID will be used to monitor the breathing zone on an ongoing basis during tasks which may result in employee exposures. In addition, it will be left on in the vicinity of work activities to passively monitor the area at all times. In addition, the audible alarm will be set to alert workers if 10 ppm is detected during passive monitoring.

Carbon filter change-out and handling of vapor condensate is to be performed by a specialized subcontractor. During carbon change-out, air monitoring will be conducted at the carbon vessels as the hoses are disconnected, and in the breathing zone on an ongoing basis. In addition, passive air monitoring will be conducted continuously in the vicinity of work activities with the audible alarm set to 10 ppm." In addition, when opening the carbon vessels, personnel shall use respiratory protection as a precaution against venting vapors. If PID readings in the breathing zone exceed 10 ppm sustained for 5 minutes, and engineering controls are unable to reduce the measured levels, personnel exposure monitoring shall be performed during carbon change-out activities.

In addition to the monitoring recommended above, site personnel will be advised to use respiratory protection at their own discretion based upon odor, irritation, or other subjective

indications. Half-face or full-face air purifying respirators will be available on-site for this purpose.

Air monitoring equipment used during the field activities will be calibrated at the beginning of the field effort and at prescribed intervals, in accordance with the manufacturer's requirements. PIDs will be calibrated at least once per day, when in use. Calibration data will be documented in the Instrument Calibration Record (included in Attachment B-1 of the Sampling and Analysis Plan). Detailed calibration procedures for equipment are available from the specific manufacturers' instruction manuals. A label specifying the scheduled date of the next calibration will be attached to each field equipment item or, at a minimum, calibration records for the equipment will be readily available for reference.

5.2 INTRUSIVE SAMPLING

In general, all proposed well locations should be assumed to pose a health and safety risk, until field measurements indicate otherwise. A designated person shall systematically use the PID to survey the work area as well installation and soil sampling progress. Systematic air monitoring shall include directly monitoring each soil sample, as well as monitoring the breathing zone and the area immediately adjacent to the borehole as each sample core is withdrawn from the ground or opened by field personnel. Monitoring will also be done during auger changes if positive readings are noted in sample cores. In addition, the PID will be used to passively monitor the area at all times with the audible alarm set at 10 ppm. If elevated PID meter readings (10 ppm or more of organic vapors for five minutes) are encountered in the breathing zone, workers will retreat to a safe area (support area for each site) and discontinue site operations. Once the situation can be evaluated, the sampling team will be instructed to don the appropriate level of PPE.

6.0 PERSONNEL PROTECTION

The following section presents requirements for personnel protection.

6.1 PROTECTIVE EQUIPMENT

The minimum level of protection for personnel working on site includes:

Hardhat	Sampling gloves and leather work gloves
Steel-toed boots	Reflective vests
Safety glasses	Work clothes

During activities where skin contact is a potential exposure mechanism, nitrile gloves will be used.

Chemical goggles or safety glasses will be worn during sampling to prevent eye contact with potentially contaminated media.

Hearing protection, when required, will consist of the worker's choice of earplugs or earmuffs.

The use of respiratory protection is not anticipated during site activities. Respiratory protection may be used upon request of on-site personnel. If the HSO determines that site conditions have changed to warrant respiratory protection, site operations will discontinue and the situation will be evaluated, as described in Section 5.0.

7.0 WORK ZONES AND SITE SECURITY

The following section presents work zone designations and site security.

7.1 EXCLUSION ZONE

During intrusive sampling, the active work areas (within 15 feet) around each sampling location will be considered the Exclusion Zone (EZ). The EZ will be modified, as necessary, as activities are started and/or completed at specific locations. Barricades, warning tape, temporary construction fence, or other such measures may be used to demarcate such areas. To prevent unauthorized access to the SVE system equipment, an exclusion zone will consist of a fenced area with a locking gate.

The wellfield area is secured within a locked building. Access to these zones will be limited to authorized personnel with the appropriate protective equipment, who have met the training and medical requirements appropriate for their level of work effort and protection. Personnel working in the EZ will utilize the buddy system.

7.2 SUPPORT AREA

All areas not included in either the EZ or the Decontamination Area will be considered Support Areas.

7.3 DECONTAMINATION AREA

The decontamination area will be located immediately adjacent to the EZ. All site personnel exiting the EZ will be required to exit through the Decontamination Zone before proceeding to the Support Area.

7.4 SITE SECURITY

The immediate work area will be secured (with use of traffic cones) to prevent inadvertent or unauthorized entry during site activities.

Only authorized personnel with appropriate badging/security clearance are allowed access into the Hunters Point Naval Shipyard.

8.0 DECONTAMINATION PROCEDURES

The following section describes decontamination procedures for the project.

8.1 PERSONAL DECONTAMINATION

All disposable PPE will be placed in a trash bag and disposed of in on-site trash receptacles for subsequent off-site disposal.

8.2 EQUIPMENT DECONTAMINATION

Any equipment that comes in contact with contaminated materials will be properly cleaned before leaving the site. Drilling and sampling equipment will be properly decontaminated before and after

operation in each borehole. A triple rinse decontamination procedure, as described below, will be used. Alternatively, a steam cleaner may be utilized to decontaminate larger equipment.

- First step: Submerge equipment into non-phosphate (e.g. alconox) soapy tap water, scrubbing off all visible soil with a stiff scrub brush.
- Second step: Submerge the equipment into a distilled water rinse and rinse thoroughly.
- Third step: Submerge the equipment thoroughly into the final distilled water rinse.

8.3 DECONTAMINATION MATERIALS

All decontamination water will be collected for disposal at a proper disposal facility. Potentially contaminated personnel protective equipment and other potentially contaminated disposable equipment will be collected and disposed of within 90 days of generation at an appropriate site.

9.0 GENERAL SITE SAFETY PROVISIONS

The following section presents General Site Health and Safety work rules.

9.1 GENERAL SITE HEALTH AND SAFETY AND WORK RULES

1. No consumption of alcoholic beverages or illegal drugs will be allowed on-site. Anyone reporting to work under the influence of alcohol and/or illegal drugs will be subject to disciplinary action. Any employee under a physician's care and/or taking prescribed narcotics must notify the Project Supervisor.
2. Personal protective equipment is required in designated areas. Such equipment may include, but is not limited to, respiratory protection, earplugs/earmuffs, hardhat, Tyvek coveralls, steel-toed boots, gloves, chemical goggles, safety glasses, and protective faceshields.
3. Eating, drinking, smoking, and chewing gum or tobacco is allowed only in designated areas in the Support Zone.
4. Changes in work practices or work rules will be implemented only after approval by the project supervisor.

5. Construction equipment always has the right-of-way over regular vehicles.
6. All employees entering the EZ must complete the required decontamination procedure before leaving the site.
7. Protective clothing to be worn inside the EZ will be supplied. None of this clothing will be permitted to leave the site with any employee for personal use. Any equipment to be used elsewhere for another project will be fully decontaminated before leaving the site.
8. Employees shall listen for warning signals on construction equipment and shall yield to construction equipment.
9. All equipment operators shall pay deliberate attention to workers on the ground who may be in their path and provide these people with warning before moving.
10. All workers shall follow emergency procedures explicitly.
11. Kneeling and/or sitting directly on the ground in the Exclusion Area is prohibited.
12. All employees will utilize a buddy system while working on site.

9.2 CONDITIONS OF SITE ACCESS TO THE EXCLUSION ZONE

1. All personnel must meet the medical monitoring requirements of 29 CFR 1910.120/8 CCR 5192 and 8 CCR 5144 and described in Section 12.0. Failure to submit to, or pass, any examination will be grounds for excluding the employee from the site.
2. All employees must participate in the air quality exposure-monitoring program by wearing personal monitors or sampling devices if designated by the HSO. Any employee refusing to participate in the program, or tampering with a monitor or sample, will be subject to disciplinary action.
3. No beards or long sideburns will be allowed by personnel utilizing respiratory protection since they interfere with the seal of the respirator to the face. Trimmed sideburns and mustaches are acceptable. All employees potentially using respirators must report to work clean shaven.

4. All employees must complete the required training programs prior to starting work at the site.
5. All on-site personnel must wear the prescribed health and safety equipment, and go through the decontamination procedures prior to exiting the site.

10.0 EMERGENCY PROCEDURES

Potential on-site emergencies are expected to be restricted to minor fires or injuries to site personnel. On-site conditions are expected to be within the limits of measures that can be taken by on-site personnel. Any emergency that poses a potential threat to the public will be considered a situation requiring outside assistance from emergency response agencies and/or Hunters Point Naval Shipyard personnel. During any on-site emergency, work will cease until the emergency is brought under control.

Whenever possible, personnel injured while working in the Exclusion Zone will be decontaminated, if necessary, as long as such procedures do not further compromise the health and safety of the individual.

Directions for the emergency route to the hospital are included in Table 1 and shown in Figure 2. A copy of the directions will be kept on site and readily available in site vehicles. A list of the emergency telephone numbers is also included in Table 1, and will also be kept near the site telephone and site vehicles. Table 2 presents an Activity Hazard Analysis for specific project tasks. All personnel working on site will be informed of the emergency numbers, emergency routes and activity hazards, and will also be informed of evacuation routes, meeting places, and evacuation warning signals in case of the need for an evacuation. At least one member of every field team (generally the Site Safety Officer and/or his alternate) will be certified in the American Red Cross "Multimedia First Aid" and "Cardiopulmonary Resuscitation Modular" or equivalent.

Any spill of contaminated soil or purge water will be immediately contained and cleaned-up at the time of the spill. Attachment 3 presents the Standard Operating Procedures for Spill Response.

Personnel designated to provide first aid to injured workers will receive training and information as required for bloodborne pathogens. The site first-aid kits will be outfitted with universal precaution protective gear for prevention of exposure to bloodborne pathogens during treatment of injured workers. Any items which come in contact with blood or other body fluids will be "red bagged" and disposed of as medical waste. Each employer having designated first aid responders on site must maintain their own Bloodborne Pathogens Exposure Control Plan. Potentially affected individuals will be advised of the hazards and modes of transmission of bloodborne pathogens and offered the option of receiving a Hepatitis B vaccination series.

10.1 EMERGENCY RESPONSE ASSIGNMENTS

Brett Womack or Brian Dee (the alternate HSO) will function as the Response Coordinator for emergency operations at the site, and will provide telephone notification to designated Navy contacts.

Mr. Womack will function as the initial site contact for response teams arriving at the site. After notifying Navy personnel, Mr. Womack will assign an individual who will wait at the site to provide initial information regarding the nature of the emergency, and direct response teams to the Response Coordinator. The Response Coordinator will assign additional roles during the emergency, as needed.

10.2 SITE GATHERING POINT

In the event of a site emergency, all personnel will meet at the Support Area designated for each site, as shown in Figure 3. If necessary, the group would then proceed to the Backup Gathering Point at ITSI's Site Trailer adjacent to Building 241, located near the corner Spear and Fisher Streets.

The signal for evacuation will be three long blasts on a vehicle horn repeated at 15 second intervals. In the case that the vehicle horn is not working, hand held two way radios issued to each sampling team for the duration of field activities will be used to communicate the evacuation. As further backup, a hand-held emergency air horn will be available. Three long blasts repeated at 15 second intervals on an air horn will be used if vehicle horns are not functional or cannot be heard by everyone, and/or in case radios are not sufficient for alerting everyone in an emergency. Site personnel will be instructed to observe the site conditions and proceed immediately to the gathering point, by taking the most direct route in a manner that prevents exposure to contaminants or the emergency condition. One person will be appointed to account for everyone at the gathering point. The gathering point provides a location for everyone to receive additional instructions.

11.0 TRAINING

All on-site personnel working in the Exclusion Zone will have appropriate prior experience and training, in compliance with 29 CFR 1910.120 and 8 CCR 5192. Such training includes the OSHA 40-hour basic hazardous waste operations and emergency response training, three days of supervised field experience, 8-hour update training, and 8-hour supervisory training as appropriate.

A project-specific training session will be provided prior to startup of on-site work. This training will include:

1. Site health and safety plan
2. Decontamination
3. Personal protection levels
4. Potential chemical hazards
5. Physical hazards
6. Medical monitoring
7. Air monitoring
8. Use and maintenance of personal protective equipment
9. Work zones
10. Site safety rules and conditions of employment
11. Emergency provisions
12. Buddy system

On-site tailgate meetings will be held before each workday to reinforce pertinent topics from the above list and to anticipate problems that may arise during the day. The Project Supervisor will conduct these meetings for their respective crews. These meetings may be combined into a single meeting in order to aid coordination between the contractors. This training will be documented (using appropriate safety forms provided in Attachment 1) as part of the daily documentation for the site.

12.0 MEDICAL MONITORING

All on-site personnel who will have potential exposure to the site contaminants will participate in a medical monitoring program. Any site personnel and visitors who have not received medical clearance must be excluded from the active work areas.

For those employees regularly working in the Exclusion Zone, the monitoring program will consist of either a corporate annual physical examination or a pre-employment physical (if the employee was hired specifically for this job) which includes:

1. Medical history
2. Physical exam
3. Pulmonary function test
4. Audiogram
5. Blood chemistry
6. CBC with differential and platelets
7. Urinalysis with dipstick and microscopic morphology

For those employees who work infrequently in the Exclusion Zone (site visitors and those needing only occasional access) and/or who may be expected to use respirators, the medical exam will be that which the examining physician determines is sufficient for clearance to use respiratory protection.

Employees not directly involved with site activities are not subject to the medical monitoring requirements.

13.0 DOCUMENTATION

Documentation of each employee's compliance with the training and medical monitoring requirements, and their signature indicating they have reviewed and will comply with this HSP, which will be maintained on site. In addition, any required permits, copies of tailgate meeting minutes, air monitoring data, and accident reports will be maintained on site. Safety field forms are included in Attachment 1.

14.0 REFERENCES

California Code of Regulations (CCR). Title 8 Section 5192. Hazardous Waste Operations and Emergency Response

Code of Federal Regulations (CFR). Title 29 Part 1910.120. Hazardous Waste Operations and Emergency Response.

Environmental Health Consultants, Inc., 1998. Innovative Technical Solution Inc. Corporate Health and Safety Program (Revision 2), August.

Morrison Knudsen [MK] and Tetra Tech EM Inc. [TtEMI], 1999. Final Parcel B Remedial Design Document VI, Confirmation Sampling and Analysis Plan (SAP)

TtEMI, 2001. Final Remedial Design Documents Amendment, Parcel B, Hunters Point Shipyard, San Francisco, California, February 20.

Table 1

Route to Hospital

1. Leave Hunters Point Naval Shipyard through the main gate.
 2. Go northwest on Evans Avenue, past Third Street, to Ceasar Chavez (formerly Army) Street.
 3. Go west on Ceasar Chavez approximately 3/4 mile to St. Luke' Hospital, at 3555 Caesar Chavez Street.
 4. An alternative hospital is San Francisco General Hospital. To reach this hospital take Potrero Avenue, from Ceasar Chavez, to the north approximately 1/2 mile to 1001 Potrero Avenue.
- See Figure 1 for Hospital Route.**

Contact	Phone Number
Police Department	911
Fire Department	911
Hospital: St Luke's Hospital, 3555 Ceaser Chavez Street, San Francisco, CA 94110	(415) 641-6625
Hospital: San Francisco General Hospital, 1001 Potrero Avenue, San Francisco, CA 94110	(415) 206-8111
Ambulance:	911
Innovative Technical Solutions, Inc.: Site Phone	415-671-0773
Brett Womack, Site HSO/Supervisor Cellular Phone	(925) 250-8027
Brian Dee, Alt. Site Supervisor Site Phone	415-671-0773
Rachel Hess, Project Manager Office Phone	(925) 946-3105
Cellular Phone	(510) 715-7842
Environmental Health Consultants, Inc.: Irene S. Fanelli	
Office	(650) 347-9205
Pager	(888) 881-5128
Cellular Phone	(650) 906-7397

TABLE 2
ACTIVITY HAZARD ANALYSIS
Health and Safety Plan
Parcel B Soil Vapor Extraction Treatability Study
Hunters Point Naval Shipyard, San Francisco, California

<i>Analyzed By:</i>	C. Gilmore	<i>Date:</i>	August 8, 2003
<i>Checked By:</i>	J. Hess	<i>Date:</i>	August 11, 2003

ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Vapor Monitoring and Sampling prior to Phase III Well Installation		
Monitor baseline soil vapor at existing soil vapor extraction (SVE) and vapor monitoring (VM) wells; collect soil vapor samples from five of the existing wells.	Potential exposure to contaminants of concern (COCs) as organic vapors	Conduct air monitoring using a photo ionization detector (PID); follow action levels specified in Table 5.1 of the Health and Safety Plan.
Well Installation and Development; Soil Sampling; Decontamination		
Install new SVE and VM wells to augment the existing network; perform well development and testing; collect subsurface soil samples during well borehole installation; decontaminate equipment.	Potential exposure to contaminated soils and/or organic vapors	Wear gloves and other designated personal protective equipment (PPE), including respiratory protection when indicated by air sampling; use proper tools for the task.
	Operating/working in the vicinity of heavy equipment	Establish exclusion zone around drilling and sampling area. Limit access to exclusion zone during site activities. Operate machinery in accordance with manufacturer's recommended safe practices.
	Fire	Provide fire extinguishers on drill rig and in vehicles.
	Noise	Wear hearing protection if needed.
	Eye injury	Wear safety glasses.

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ACTIVITY HAZARD ANALYSIS
Health and Safety Plan
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Hunters Point Naval Shipyard, San Francisco, California

ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
Well Installation and Development; Soil Sampling; Decontamination (Continued)		
	Heat or cold stress	Wear work clothes that are appropriate for conditions; be alert for signs of heat or cold stress. In hot weather, seek shade, provide fluids, and implement scheduled rest breaks when needed. In cold weather, avoid exposure to wind and/or water.
	Slips, trips, and falls	Maintain an orderly work area; keep tools and equipment away from areas of egress; pay attention to footing; negotiate uneven terrain with care; wear steel-toed shoes to protect feet.
	Potential exposure to biological hazards	Be vigilant for and, when possible, avoid contact with snakes, spiders, ticks, insects, poison oak, or other biological hazards; wear long pants; keep pants legs tucked into boots; observe for and avoid contact with dead animals and/or their fecal material (especially rodents to avoid possible exposure to hantavirus).
	Dust	Wear dust mask if needed.
SVE System Construction, Operation, and Maintenance; Vapor Sampling		
Construct SVE system; perform system O&M for eight months; conduct influent soil vapor monitoring and sampling at new wells.	Potential exposure to COCs as organic vapors	Conduct air monitoring using a PID; follow action levels specified in Table 5.1 of the Health and Safety Plan.
	Electrical hazards	Only qualified and experienced licensed electricians shall install or work near live electrical circuits unless all guards/shields/covers are in place and approved for use. Follow safety precautions in Section 4.1.4 of the site health and safety plan.

TABLE 2
ACTIVITY HAZARD ANALYSIS
 Health and Safety Plan
 Parcel B Soil Vapor Extraction Treatability Study
 Hunters Point Naval Shipyard, San Francisco, California

ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
SVE System Construction, Operation, and Maintenance; Vapor Sampling (Continued)		
	Lifting hazards; potential strains from handling heavy equipment	Use proper lifting techniques, as defined in Section 4.1.1 of the site health and safety plan. Wear steel-toed work boots.
	Noise	Wear hearing protection if needed.
	Slips, trips, and falls	Maintain an orderly work area; keep tools and equipment away from areas of egress; pay attention to footing; negotiate uneven terrain with care; wear steel-toed shoes to protect feet.
Carbon Filter Changeout		
Perform change-out of carbon filter units and handling of condensate.	Inhalation exposure of vapors and contact with liquid condensate	Carbon change-out will be performed by a specialized subcontractor. Air monitoring with a PID shall be conducted and personnel shall use respiratory protection when opening the carbon vessels. If PID readings exceed 10 parts per million (ppm) sustained for 10 minutes, and engineering controls are unable to reduce the measured levels, exposure monitoring shall also be performed.
	Discharge of hazardous electrical energy, potential electrical shock during changeout	The system must be completely shut down and locked out during carbon filter change-out. Only qualified and experienced electricians shall perform maintenance or servicing of electrical equipment or circuits. All ignition sources such as static, electrical energy, and open flames shall be eliminated when vessels are to be opened, or condensate is to be handled. Grounding and bonding cables will be applied in accordance with the ITSI Lockout/Tagout SOP. "NO SMOKING" signs shall be posted and enforced.

TABLE 2
ACTIVITY HAZARD ANALYSIS
 Health and Safety Plan
 Parcel B Soil Vapor Extraction Treatability Study
 Hunters Point Naval Shipyard, San Francisco, California

ACTIVITY	POTENTIAL SAFETY/HEALTH HAZARDS	RECOMMENDED CONTROLS
SVE System Shutdown; Rebound Vapor Monitoring; Post-study Sampling		
Shut down and demobilize SVE system; following system shutdown, monitor rebound soil vapor at SVE and VM wells; collect soil vapor samples from five of the wells.	Electrical hazards	Only qualified and experienced licensed electricians shall work near live electrical circuits unless all guards/shields/covers are in place. Follow safety precautions in Section 4.1.4 of the site health and safety plan.
	Potential exposure to COCs as organic vapors	Conduct air monitoring using a PID; follow action levels specified in Table 5.1 of the Health and Safety Plan.
Waste Handling		
Collect, handle, and containerize investigation-derived waste (IDW); store, transport and dispose of waste.	Potential exposure to contaminated soils and/or organic vapors	Wear gloves and other designated personal protective equipment (PPE), including respiratory protection when indicated by air sampling; use proper tools for the task.
	Lifting hazards; potential strains from handling drums	Use proper lifting techniques, as defined in Section 4.1.1 of the site health and safety plan; using a drum dolly if handling heavy drums. Wear appropriate PPE including steel-toed work boots.
	Vehicle/pedestrian safety issues	Avoid driving in tall grass areas to prevent fires; use high visibility clothing when working around vehicles; practice safe, defensive driving skills. Use traffic cones, barriers, and/or traffic control on roadways as necessary.
	Dust	Wear dust mask if needed.

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Volatile Organic Compounds						
Benzene	1	5 2.5 ACGIH	0.5	Inhalation, absorption, ingestion contact	Irritation of eyes, skin, nose, respiratory system; giddiness, headache, nausea, staggered gait; fatigue, anorexia, lassitude; dermatitis; bone marrow depression; (potential occupational carcinogen)	Eyes, skin, respiratory system, blood, central nervous system, bone marrow, (leukemia)
Bromodichloromethane	NL	NL	NL	NL	NL	NL
Carbon disulfide	4	12 30 Ceiling	10	Inhalation, absorption, ingestion, contact	Dizziness, headache, poor sleep, fatigue, nervousness, anorexia, low weight; psychosis; polyneuropathy; Parkinson- like syndrome; ocular changes; coronary heart disease; gastritis; kidney, liver injury; eye, skin burns; dermatitis; reproductive effects	Central nervous system, peripheral nervous system, cardiovascular system, eyes, kidneys, liver, skin, reproductive system
Carbon tetrachloride	4	12	5	inhalation, absorption, ingestion, contact	Irritation eyes, skin; central nervous system depression; nausea, vomiting; liver, kidney injury; drowsiness, dizziness, incoordination (potential occupational carcinogen)	Central nervous system, eyes, lungs, liver, kidneys, skin
Chlorobenzene	10	NL	75	inhalation, ingestion, contact	Irritation eyes, skin, nose; drowsiness, incoordination; central nervous system depression; in animals: liver, lung, kidney injury	Eyes, skin, respiratory system, central nervous system, liver
Chloroform	2	NL	10	Inhalation absorption, ingestion, contact	Irritation of eyes, skin; dizziness, mental dullness, nausea, confusion; headache, fatigue; anesthesia; enlarged liver; (potential occupational carcinogen)	Liver, kidneys, heart, eyes, skin, central nervous system, (in animals: liver and kidney cancer)
Chloromethane	5	100 300 Ceiling 100 ACGIH	50	Inhalation, contact	Dizziness, nausea, vomiting; visual disturbance,, staggering, slurred speech, convulsions, coma; liver, kidney damage, liq: frostbite, reproductive, teratogenic effects; (potential occupational carcinogen)	Central nervous system, kidneys, reproductive system, [in animals] lung, kidney & forestomach tumors
1,4-Dichlorobenzene	10	110	10	Inhalation, absorption, ingestion, contact	Eye irritation, swelling periorbital (situated around the eye); prof rhinitis; headache, anorexia, nausea, vomiting; weight loss, jaund cirrhosis; in animals: liver, kidney injury; [potential occupational carcinogen]	Liver, respiratory system, eyes, kidneys, skin
1,2-Dichloroethane	1	2 200 Ceiling	10	Inhalation, ingestion, absorption, contact	Irritation of eyes, corneal opacity; central nervous system depress nausea, vomiting; dermatitis; liver, kidney, cardiovascular system damage; (potential occupational carcinogen)	Eyes, skin, kidneys, liver, central nervous system, cardiovascular system

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
1,1-Dichloroethene	1	NL	5	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin, throat; dizziness, headache, nausea, dyspnea (breathing difficulty); liver, kidney disturbance; pneumonitis; (potential occupational carcinogen)	Eyes, skin, respiratory system, central nervous system, liver, kidneys
1,2-Dichloroethene	200	NL	200	Inhalation, ingestion, contact	Irritation of eyes, respiratory system; central nervous system depression	Eyes, respiratory system, central nervous system, liver,
1,2-Dichloropropane	75	110	75	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin, respiratory system; drowsiness, dizziness; kidney damage; in animals: central nervous system depression; (potential occupational carcinogen)	Eyes, skin, respiratory system, liver, kidneys, central nervous system
Naphthalene	10	15	10	Inhalation, ingestion, contact	Irritation of eyes, nose, throat; respiratory sensitization, cough, pulmonary secretions, chest pain, dyspnea; asthma	Eyes, respiratory system
2,2'-Oxybis(1-chloropropane)	NL	NL	NL	NL	NL	NL
1,1,2,2-Tetrachloroethane	1	NL	1	Inhalation, absorption, ingestion, contact	Nausea, vomiting, abdominal pain; tremors in fingers; jaundice, hepatitis, liver tenderness; dermatitis; monocytosis; kidney damage; (potential occupational carcinogen)	Skin, liver, kidneys, central nervous system, gastrointestinal tract, (in animals: liver tumors)
Tetrachloroethene	25	100 300 Ceiling	25	Inhalation, absorption, ingestion, contact	Irritation of eyes, nose, throat; nausea; flushing of the face, neck; dizziness, incoherence; headache, somnolence; skin erythema; liver damage; (potential occupational carcinogen)	Eyes, skin, respiratory system, liver, kidneys, central nervous system, (in animals: liver tumors)
Trichloroethene	25	100 300 Ceiling	50	Inhalation, absorption, ingestion, contact	Irritated eyes, skin; headache, vertigo; visual disturbance, fatigue, giddiness, tremor, somnolence, nausea, vomiting; dermatitis; cardiac arrhythmias, paresthesia; liver injury; (potential occupational carcinogen)	Eyes, skin, respiratory system, heart, liver, central nervous system, (in animals: liver and kidney cancer)
Vinyl chloride	1	NL	1	Inhalation, contact, liquid	Weakness; abdominal pain, gastrointestinal bleeding; enlarged liver; pallor or cyanosis of extremities; liquid; frostbite; (potential occupational carcinogen)	Liver, central nervous system, blood, respiratory system, lymphatic system, liver cancer
Semivolatile Organic Compounds						
Bis (2-ethylhexyl) phthalate	5 mg/m ³	10 mg/m ³	5 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, mucous membranes; in animals: liver damage; teratogenic effects; (potential occupational carcinogen)	Eyes, respiratory system, central nervous system, liver, reproductive system

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Coal Tar Pitch Volatiles Acenaphthene Anthracene Benzo(a)anthracene Benzo(a)pyrene Benzo(b)fluoranthene Benzo(k)fluoranthene Chrysene Dibenzo(a,h)anthracene Fluorene Indeno(1,2,3-c,d)pyrene Phenanthrene	0.2 mg/m ³	NL	0.2 mg/m ³	Inhalation, contact	Dermatitis, bronchitis, (potential occupational carcinogen)	Respiratory system, skin, bladder, kidneys; lung, kidney and skin
3,3'-Dichlorobenzidine	0.005			Inhalation, absorption, ingestion, contact	Skin sensitization, dermatitis; headache, dizziness; caustic burns; frequent urination, dysuria; hematuria (blood in the urine); gastrointestinal upset; upper respiratory infection; (potential occupational carcinogen)	Bladder, liver, lung, skin, gastrointestinal tract
Dibenzofuran	NL	NL	NL	NL	NL	NL
1,2,3,4,6,7,8-Heptachloro-dibenzodioxin	NL	NL	NL	NL	NL	NL
Heptachlorodibenzodioxin	NL	NL	NL	NL	NL	NL
1,2,3,4,6,7,8-Heptachloro-dibenzofuran	NL	NL	NL	NL	NL	NL
Heptachlorodibenzofuran	NL	NL	NL	NL	NL	NL
n-Nitroso-di-n-propylamin	NL	NL	NL	NL	NL	NL
Octachlorodibenzodioxin	NL	NL	NL	NL	NL	NL
Pentachlorophenol	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, absorption, ingestion, contact	Irritation of eyes, nose, throat; sneezing, coughing, weakness, anorexia, low-weight; sweating; headache, dizziness; nausea, vomiting; dyspnea, chest pain; high fever, dermatitis.	Eyes, skin, respiratory system, cardiovascular system, liver, kidneys, central nervous system

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Organic Pesticide Compounds						
Aldrin	0.25 mg/m ³	NL	0.25 mg/m ³	Inhalation, absorption, ingestion, contact	Headache, dizziness, nausea, vomiting, malaise, ; myoclonic jerks of limbs; clonic, tonic, convulsions; coma; hematuria, azotemia; (potential occupational carcinogen)	Cancer, central nervous system, liver, kidneys, skin
Chlordane	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, absorption, ingestion, contact	Blurred vision; confusion; ataxia, delirium; cough; abdominal pain, nausea, vomiting, diarrhea; irritability, tremor, convulsions; anuria	Central nervous system, eyes, lungs, liver, kidneys
4,4'-DDE	NL	NL	NL	NL	NL	NL
4,4'-DDT	1 mg/m ³	NL	1 mg/m ³	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin; paresthesia, tongue, lips, face; tremor; apprehension, dizziness, confusion, malaise, headache, fatigue; convulsions, paresis hands; vomiting; (potential occupational carcinogen)	Eyes, skin, central nervous system, kidneys, liver, peripheral nervous system
Dieldrin	0.25 mg/m ³	NL	0.25 mg/m ³	Inhalation, absorption, ingestion, contact	Headache, dizziness, nausea, vomiting, malaise, sweating; myoclonic limb jerks; clonic, tonic convulsions; coma; potential occupational carcinogen	Central nervous system, liver, kidneys, skin
Endosulfan sulfate	NL	NL	NL	NL	NL	NL
Endrin	0.1 mg/m ³	NL	0.1 mg/m ³	Inhalation, absorption, ingestion, contact	Epileptiform convulsions; stupor, headache, dizziness; abdominal discomfort, nausea, vomiting; insomnia; aggressiveness, confusion; lethargy, weakness; anorexia	Central nervous system, liver,
Heptachlor	0.05 mg/m ³	NL	0.05 mg/m ³	Inhalation, absorption, ingestion, contact	In animals: tremor; convulsions; liver damage	Central nervous system, liver, (in animals: liver cancer)
Heptachlor epoxide	NL	NL	0.05	NL	NL	NL
Polychlorinated Biphenyl Compounds						
Polychlorinated biphenyls (PCBs); (chlorodiphenyl; Arochlor 1016)	NL	NL	NL	NL	NL	NL
Polychlorinated biphenyls (PCBs); (chlorodiphenyl; Arochlor 1254)	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, absorption, ingestion, contact	Irritation of eyes; chloracne; liver damage; reproductive effects; (potential occupational carcinogen)	Skin, eyes, liver, reproductive system, (in animals: tumors of the pituitary gland and liver, leukemia)

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Polychlorinated biphenyls (PCBs); (chlorodiphenyl; Arochlor 1260)	NL	NL	NL	Inhalation, absorption, ingestion, contact	Irritation of eyes; chloracne; liver damage; reproductive effects; (potential occupational carcinogen)	Eyes, skin, liver, reproductive system
Petroleum Hydrocarbon Compounds						
Diesel	NL	NL	100 as total HC	Inhalation, absorption, ingestion, contact	Expected to be similar to gasoline	Eyes, skin, respiratory system, central nervous system, liver, kidneys, (in animals: liver and kidney cancer)
Gasoline	300	500	300	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin, mucous membranes; dermatitis; headache, fatigue, blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonia (aspiration); possible liver, kidney damage; (potential occupational carcinogen)	Eyes, skin, respiratory system, central nervous system, liver, kidneys, (in animals: liver and kidney cancer)
Oil (mineral) mist, particulate	5 mg/m ³	10	5 mg/m ³	Inhalation, contact	Irritation of eyes, skin, respiratory system	Eyes, skin, respiratory system
Inorganics						
Aluminum metal and oxide (respirable fraction)	5 mg/m ³	NL	10 mg/m ³	Inhalation, contact	Irritation of eyes, skin, respiratory system	Eyes, skin, respiratory system
Aluminum (soluble salts and alkyls, as Al)	2 mg/m ³	NL	2 mg/m ³	Inhalation, ingestion, contact	Irritation of skin, respiratory system; skin burns	Skin, respiratory system
Antimony and compounds, as Sb	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, skin, nose, throat, mouth; coughing; dizziness; headache; nausea, vomiting, diarrhea; stomach cramps; insomnia; anorexia; unable to smell properly	Eyes, skin, respiratory system, central nervous, system
Arsenic (inorganic compounds, as As)	0.01 mg/m ³	NL	0.01 mg/m ³	Inhalation, absorption, ingestion, contact	Ulceration of nasal septum, dermatitis, gastrointestinal disturbances, peripheral neuropathy, respiratory irritation, hyperpigmentation of skin; (potential occupational carcinogen)	Liver, kidneys, skin, lungs, lymphatic system, (lung and lymphatic cancer)
Arsenic (organic compounds, as As)	0.2 mg/m ³	NL	NL	Inhalation, ingestion, contact	In animals: irritation of skin, possible dermatitis; respiratory distress; diarrhea; kidney damage; muscle tremor, seizure; possible gastrointestinal tract, teratogenic, reproductive effects; possible liver damage	Skin, respiratory system, kidneys, central nervous system, liver, gastrointestinal tract, reproductive system

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Arsine	0.05	NL	0.05	Inhalation, contact (liq)	Headache; nausea; malaise; weakness; dizziness; vomiting; dyspnea; abdominal and back pain; bronze skin; hematuria; peripheral neuropathy; lung and lymphatic cancer	Blood, kidneys, liver, lung and lymphatic system
Barium (soluble compounds, as Ba)	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, skin, upper respiratory system; skin burns, gastroenteritis; muscle spasm; slow pulse, extrasystoles; hypokalemia	Eyes, skin, respiratory system, heart, central nervous system
Beryllium and Be compounds	0.002 mg/m ³	0.005 0.025 mg/m ³ Ceiling	0.002 mg/m ³	Inhalation, contact	Berylliosis (chronic exposure); anorexia, low weight, weakness, chest pain, cough, clubbing of fingers, cyanosis, pulmonary insufficiency; irritation of eyes; dermatitis; (potential occupational carcinogen)	Eyes, skin, respiratory system (lung cancer)
Cadmium, metal dust and soluble salts, as Cd	0.005 mg/m ³	NL	0.002 mg/m ³	Inhalation, ingestion	Pulmonary edema, dyspnea, cough, chest tightness, substernal pain; headache, chills, muscle aches; nausea, vomiting, diarrhea; anosmia, emphysema, proteinuria, mild anemia; (potential occupational carcinogen)	Respiratory system, kidneys, prostate, blood, prostate and lung cancer
Chromium (II) and (III) compounds	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes; sensitization dermatitis	Eyes, skin
Chromium metal, as Cr	0.5 mg/m ³	NL	0.5 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, skin; lung fibrosis (histologic)	Eyes, skin, respiratory system
Chromium (VI) compounds, water soluble	0.05 mg/m ³	NL	0.05 mg/m ³	Inhalation, ingestion, contact	Respiratory system irritation; nasal septum perforation; liver, kidney damage; increased leukocytes; leukopenia; monocytosis; skin ulcer; sensitive skin; carcinogenic	Respiratory system, nose, skin, liver and kidney, and blood
Chromium (VI) compounds, water insoluble	0.01 mg/m ³	NL	0.01 mg/m ³	Inhalation, ingestion, contact	Respiratory system irritation; nasal septum perforation; liver, kidney damage; increased leukocytes; leukopenia; monocytosis; skin ulcer; sensitive skin; conjunctivitis	Respiratory system, nose, skin, liver and kidney, blood, and eyes
Cobalt, metal dust, as Co	0.02 mg/m ³	NL	0.02 mg/m ³	Inhalation, ingestion, contact	Coughing, dyspnea, wheezing, decreased pulmonary function; low eight; dermatitis; diffuse nodular fibrosis; respiratory hypersensitivity, asthma	Skin, respiratory system
Copper salts, dusts, and mists, as Cu	1 mg/m ³	NL	1 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, nose, pharynx; nasal perforation; metallic taste; dermatitis; in animals: lung, liver, kidney damage; anemia	Eyes, skin, respiratory system, liver, kidneys, (increased risk with Wilson's disease)
Fluorides, as F	2.5	NL	2.5	Inhalation, ingestion, contact	Irritation of eyes, nose, throat, lungs and skin; pulm. edema	Mucous membranes, skin, lungs

TABLE 3
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San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Lead, elemental and inorganic compounds, dust and fume, as Pb	0.05 mg/m ³	NL	0.05 mg/m ³	Inhalation, ingestion, contact	Weakness, lassitude, insomnia; facial pallor; pal eye, anorexia, low weight, malnutrition; constipation, pain, colic; anemia; gingival lead line; tremor; paralysis wrist, ankles; encephalopathy; kidney disease; irritation eyes; hypertension	Eyes, gastrointestinal tract, central abdominal nervous system, kidneys, blood, gingival tissue
Manganese and compound as Mn	0.2 mg/m ³	NL	0.2 mg/m ³	Inhalation, ingestion	Parkinson's; asthenia, insomnia, mental confusion; metal fume fever; dry throat, cough, chest tightness, dyspnea (breathing difficulty), rales, flu-like fever; low-back pain; vomiting; malaise (vague feeling of discomfort); lassitude (weakness, exhaustion); kidney damage	Respiratory system, central nervous system, blood, kidneys
Mercury, inorganic forms including metallic Hg	0.025 mg/m ³	NL	0.025 mg/m ³	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin; coughing, chest pain, dyspnea, bronchitis, pneumonitis; tremors, insomnia, irritability, indecision, headache, fatigue, weakness; stomatitis, salivation; gastrointestinal disturbance, anorexia, low weight; proteinuria	Eyes, skin, respiratory system, central nervous system, kidneys
Mercury (organo) alkyl compounds, as Hg	0.01 mg/m ³	0.03 0.04 mg/m ³ Ceiling	0.01 mg/m ³	Inhalation, absorption, ingestion, contact	Paresthesia; ataxia, dysarthria; vision, hearing disturbance; spasticity, jerking limbs; dizziness, salivation; lacrimation; nausea, vomiting, diarrhea, constipation; skin burns; emotional disturbance; kidney injury; possible teratogenic	Eyes, skin, central nervous system, peripheral nervous system, kidneys
Molybdenum, insoluble compounds, as Mo	10 mg/m ³	NL	3 rec. mg/m ³	Inhalation, ingestion, contact	For metallic Mo - In animals: irritation of eyes, nose, throat; anorexia, diarrhea, low weight; listlessness; liver, kidney damage	Eyes, respiratory system, liver, kidneys
Molybdenum, soluble compounds, as Mo	5 mg/m ³	NL	0.5 rec. mg/m ³	Inhalation, ingestion, contact	In animals: irritation of eyes, nose, throat; anorexia; incoordination; dyspnea; anemia	Eyes, respiratory system, kidneys, blood
Nickel metal, as Ni	1 mg/m ³	NL	1.5 mg/m ³	Inhalation, ingestion, contact	Sensitive skin, allergic asthma, pneumonitis; (potential occupational carcinogen)	Nasal cavities, lungs, skin, (lung and nasal cancer)
Nickel, insoluble compounds, as Ni	1 mg/m ³	NL	0.2 mg/m ³	Inhalation, ingestion, contact	Sensitization dermatitis, allergic asthma, pneumitis; (potential occupational carcinogen)	Nasal cavities, lungs, skin, (lung and nasal cancer)
Nickel, soluble compounds, as Ni	0.1 mg/m ³	NL	0.1 mg/m ³	Inhalation, absorption,	Sensitization dermatitis, allergic asthma, pneumitis; (potential occupational carcinogen)	Nasal cavities, lungs, skin, (lung and nasal cancer)
Nitrate as nitrogen	NL	NL	NL	NL	NL	NL
Organotin	0.1 mg/m ³	0.2 mg/m ³	0.1 mg/m ³	Inhalation, absorption, ingestion, contact	Irritation of eyes, skin, respiratory system, sore throat, cough, abdominal pain, vomit, urine retention, skin burns, kidney damage	Eyes, skin, respiratory system, central nervous system, liver, kidney urinary tract, blood

TABLE 3
ALLOWABLE CHEMICAL EXPOSURE LIMITS AND EXPOSURE SYMPTOMS
Parcel B Phase III Soil Vapor Extraction Treatability Study, Hunters Point Shipyard
San Francisco, California

CHEMICAL	PEL (a) (ppmv)	STEL (b) (ppmv)	TLV (c) (ppmv)	ROUTE OF ENTRY	ACUTE EXPOSURE SYMPTOMS	TARGET ORGANS
Selenium compounds, as Se	0.2 mg/m ³	NL	0.2 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, skin, nose, throat; vision disturbance; fever; dyspnea, bronchitis; metallic taste, garlic breath, gastrointestinal disturbance; dermatitis; eye, skin burns; headache; chills; in animals: anemia, liver necrosis, cirrhosis; kidney, spleen damage	Eyes, skin, respiratory system, liver, kidneys, blood, spleen
Silver metal and soluble compounds, as Ag	0.01 mg/m ³	NL	0.01 mg/m ³	Inhalation, ingestion, contact	Blue-gray eyes, nasal septum, throat, skin; irritation, ulceration skin, Gastrointestinal disturbance	Nasal septum, skin, eyes
Thallium, elemental and soluble compounds, as Tl	0.1 mg/m ³	NL	0.1 mg/m ³	Inhalation, absorption, ingestion, contact	Nausea, diarrhea, abdominal pain, vomiting; strabismus; peripheral neuritis, tremor; retrosternal tightness, chest pain, pulmonary edema; seizure, chorea, psychosis; liver, kidney damage; alopecia; paresthesia in the legs	Eyes, respiratory system, central nervous system, liver kidneys, gastrointestinal tract, body hair
Vanadium pentoxide, respirable dust and fume	0.05 mg/m ³	NL	0.05 mg/m ³	Inhalation, ingestion, contact	Irritation of eyes, skin, throat; green tongue, metallic taste, eczema; cough; fine rales, wheezing, bronchitis, dyspnea	Eyes, skin, respiratory system
Zinc oxide fume	5 mg/m ³	10 mg/m ³	10 mg/m ³	Inhalation	Metal fume fever; chills, muscle ache, nausea, fever, dry throat, coughing, weakness, lassitude; metallic taste; headache; blurred vision; low back pain; vomiting; fatigue; malaise; tight chest, dyspnea, rales, decreased pulmonary function	Respiratory system

Notes:

(a) PEL = Permissible Exposure Limit, Cal-OSHA; 8hr/day, 40 hr/week (Title 8 CCR Section 5155)

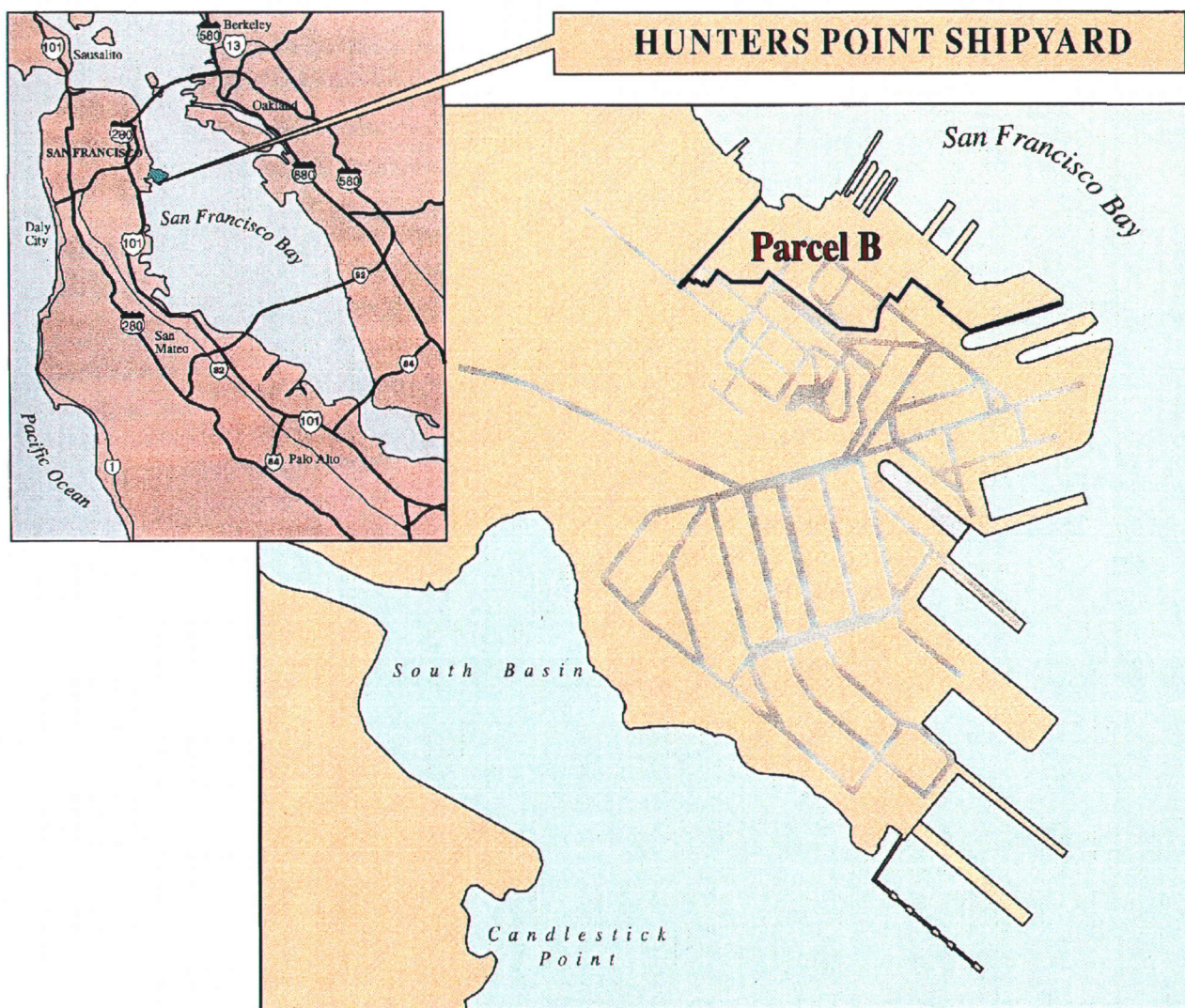
(b) STEL = Short Term Exposure Limit, Cal-OSHA or ACGIH; 15-minute period (Title 8 CCR Section 5155 or ACGIH, 2002)

(c) TLV = Threshold Limit Value, ACGIH ; 8hr/day, 40 hr/week (ACGIH, 2002)

Cal-OSHA = California Occupational Health and Safety Administration

ACGIH = American Conference of Governmental Industrial Hygienists

NL = not listed

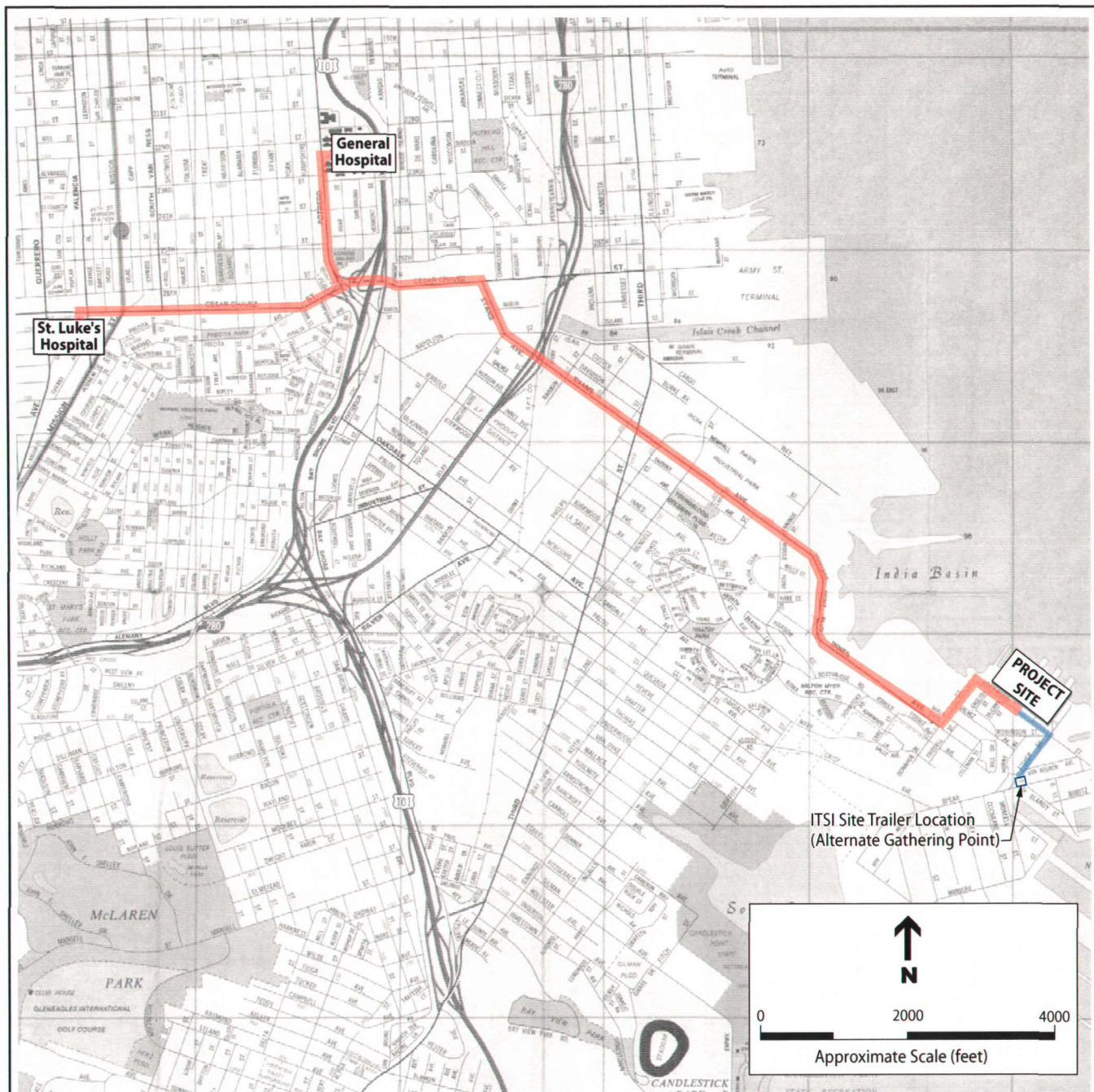


Source: Tetra Tech EM, Inc., 2003. Eleventh Parcel B Quarterly Groundwater Sampling Report,



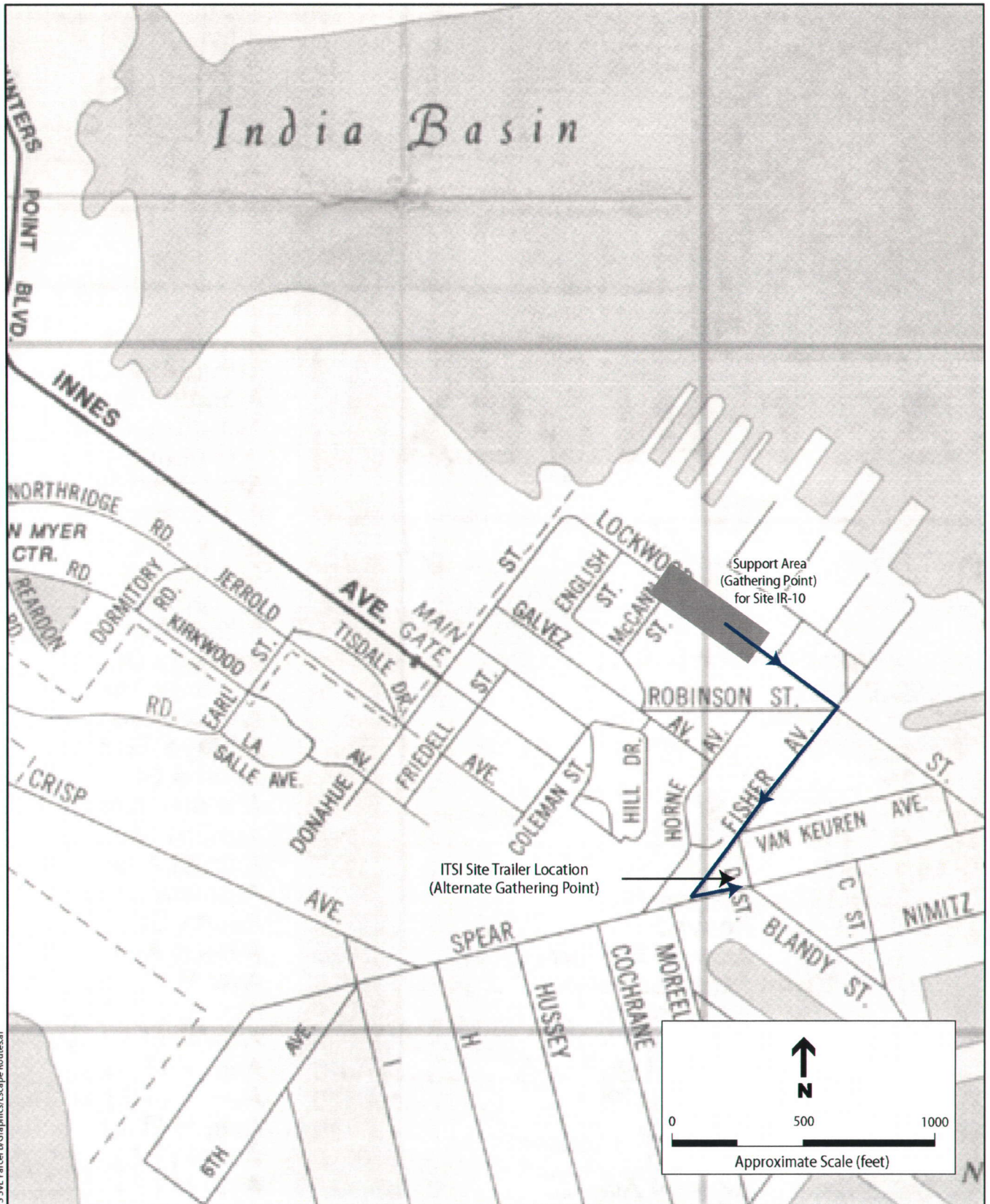
Hunters Point Naval Shipyard
Parcel B Soil Vapor Extraction Treatability Study
San Francisco, California

FIGURE 1
Parcel B Location Map



DIRECTIONS

1. Leave Hunters Point Naval Shipyard through the main gate.
2. Go northwest on Evans Avenue, past Third Street, to Cesar Chavez (formerly Army) Street.
3. Go west on Cesar Chavez approximately 3/4 mile to St. Luke's Hospital, 3555 Cesar Chavez Street.
4. An alternative hospital is San Francisco General Hospital. To reach this hospital from Cesar Chavez Street, go north on Potrero Avenue approximately 1/2 mile to 1001 Potrero Avenue.



ATTACHMENT 1

SAFETY FIELD FORMS



Hazard Communication and Right to Know Standards

Name: _____ S.S. No.: _____

Company: _____

- I have been informed about the Hazard Communication Program, Material Safety Data Sheets (MSDS), their use, location, and procedures to obtain copies.
- I have been informed that some of my work may involve exposure to toxic substances.
- I have been informed about the right of employees to have access to relevant exposure and medical records, and the procedures for requesting access.
- I understand that the employer must act upon a request in a reasonable amount of time so as to avoid the interruption of normal work, but within 15 days.

Signature/Date: _____



**Innovative
Technical
Solutions, Inc.**

TAILGATE SAFETY MEETING

DATE	TIME	JOB NUMBER
CUSTOMER	ADDRESS	
SPECIFIC LOCATION		
TYPE OF WORK		
CHEMICALS USED		

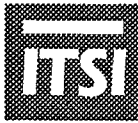
SAFETY TOPICS PRESENTED

PROTECTIVE CLOTHING/EQUIPMENT		
CHEMICAL HAZARDS		
PHYSICAL HAZARDS		
EMERGENCY PROCEDURES		
HOSPITAL	PHONE	AMBULANCE PHONE
HOSPITAL ADDRESS		
SPECIAL EQUIPMENT		
OTHER		

ATTENDEES

PRINTED NAME	SIGNATURE

CONDUCTED BY:	SIGNATURE:
SUPERVISOR	



DATE OF ACCIDENT: _____

PROJECT NAME: _____

TIME OF ACCIDENT: _____

PROJECT NUMBER: _____

WHERE OCCURRED: _____

PROJECT LOCATION: _____

ITSI EMPLOYEE? _____

SUB/VISITOR? _____

PART I - PROPERTY DAMAGE/LOSS

YES ☐

NO ☐

Complete only if property damage/loss

NAME OF EMPLOYEE INVOLVED: _____

EQUIPMENT INVOLVED (ITSI AND/OR OTHER): _____

WHERE OCCURRED (NUMBER AND STREET, CITY): _____

NAMES OF OTHER PERSONS INVOLVED: _____

DESCRIBE INCIDENT/DAMAGE: _____

ESTIMATED COST OF DAMAGE: _____

Police Report Must Be Filed on All Automobile Accidents and on All Equipment Thefts.

Copy of Police Report Must Be Sent to Corporate Health and Safety.

DRAW A DIAGRAM OF THE ACCIDENT IN THE SPACE BELOW.



ACCIDENT/LOSS REPORT

PART II - PERSONAL INJURY

YES ☐

NO ☐

Complete only if injury occurred

NAME OF INJURED EMPLOYEE: _____

HOME ADDRESS: _____

PHONE: _____

DATE OF BIRTH: _____ DATE OF HIRE: _____ SSN #: _____

EMPLOYEE'S JOB TITLE: _____ DISTRICT/REGION: _____

BODY PART(S) INJURED: _____ INJURY: _____

DESCRIBE HOW INJURY OCCURRED: _____

IS THIS A RECURRING INJURY? _____

DID EMPLOYEE? ☐ SEE A DOCTOR? ☐ GO TO A HOSPITAL? ☐ ADMITTED OVERNIGHT? ☐

IF YES, GIVE DOCTOR AND/OR HOSPITAL NAME & ADDRESS: _____

IF NO, WAS EMPLOYEE GIVEN THE OPTION OF RECEIVING MEDICAL ATTENTION? ☐ YES ☐ NO

DID YOU ATTACH A DOCTOR'S STATEMENT OF WORK ABILITY? _____

IF NOT, HAVE EMPLOYEE OBTAIN ONE IMMEDIATELY. THIS IS REQUIRED FOR RETURN TO WORK.

IS EMPLOYEE TO RETURN TO SEE A PHYSICIAN? _____ WHEN? _____

DID EMPLOYEE LOSE AT LEAST ONE FULL DAY OF WORK AFTER THE DAY OF THE INJURY? _____

EMPLOYEE NORMALLY WORKS: _____ DAYS/WEEK _____ HOURS/DAY

WAS EMPLOYEE RESTRICTED FROM PERFORMING NORMAL DUTIES? _____

RESTRICTION: _____

WAS THE EMPLOYEE IN COMPLIANCE WITH PROTECTIVE CLOTHING AND RESPIRATOR REQUIREMENTS AS
DEFINED IN THE HEALTH & SAFETY PLAN? _____

DESCRIBE PPE AND RESPIRATOR EMPLOYEE WAS WEARING: _____

DESCRIBE PREVENTIVE MEASURES TAKEN TO AVERT A RECURRENCE OF THIS TYPE OF INCIDENT:

DATE WHEN MEASURES WERE IMPLEMENTED & BY WHOM: _____



PART III - MUST BE COMPLETED FOR ALL INJURIES AND PROPERTY DAMAGE

WITNESSES:

NAME:

PHONE:

ADDRESS:

NAME:

PHONE:

ADDRESS:

NAME:

PHONE:

ADDRESS:

NAME OF SITE SUPERVISOR(S):

DATE OF THIS REPORT:

REPORT PREPARED BY:

I verify that I have read this report and that the contents are correct as to how the accident/loss occurred and was reported. I have also discussed with site management how this accident could be avoided in the future.

Employee's Signature

Date

REPORT REVIEWED AND DISCUSSED:

Site Supervisor

EMPLOYEE COMMENTS:

FOLLOW UP COMMENTS:

ATTACHMENT 2

STANDARD OPERATING PROCEDURES FOR SAMPLE HANDLING

SAMPLE HANDLING STANDARD OPERATING PROCEDURE

1.0 PURPOSE

This procedure defines minimum requirements for safe handling of soil and waste samples by all field employees.

2.0 SCOPE

This procedure applies to all samples of contaminated soil and waste.

3.0 DEFINITIONS

Sample: Material collected for the sole purpose of analytical testing to determine its composition or hazardous characteristics. Regardless of the hazardous nature of a sample, it is **not** considered a hazardous waste during collection, shipping and analysis. See 40 CFR 261.4(d). However, samples **are** subject to the Department of Transportation (DOT) shipping regulations found in 49 CFR.

4.0 REQUIREMENTS

All samples shall be packaged and shipped in accordance with DOT regulations in 49 CFR 106-180.

Sample preparation and packaging for shipment shall be done at the job site whenever possible. These activities should not occur in office buildings unless each sample is maintained in a sealed container at all times. Sample and hazardous material storage is not permitted in office buildings.

Samples shall not be transported in passenger vehicles unless packaged in appropriate DOT containers. Samples must not be transported in the passenger compartment of the vehicle. Samples should be shipped using methods such as private courier, Federal Express or UPS. Samples that may be hazardous may not be shipped via passenger carriers such as aircraft, trains or buses.

Analytical laboratory contracts and service agreements shall include the requirement for the lab to properly dispose of unused and residual samples without returning these materials to ITSI, unless specifically required by the project contract.

Personnel collecting samples must be adequately trained in proper sampling methods, Chain-of-Custody Documentation, personnel protective equipment, respirators, the hazards of the material to be sampled (if known), DOT shipping requirements and appropriate Quality Assurance/Quality Control (QA/QC) procedures.

ATTACHMENT 3

STANDARD OPERATING PROCEDURES FOR SPILL RESPONSE

SPILL RESPONSE STANDARD OPERATING PROCEDURES

1.0 PURPOSE

This procedure describes minimum safety requirements for responding to spills of hazardous or potentially hazardous materials at ITSI project work sites.

2.0 SCOPE

The requirements of this procedure apply to ITSI employees involved in spill response operations at ITSI project sites.

3.0 DEFINITIONS

DOT – Department of Transportation

PPE – Personal Protective Equipment

SSHP – Site Specific Health and Safety Plan

4.0 RESPONSIBILITIES

4.1 SAFETY AND HEALTH STAFF

The safety and health staff is responsible for assisting site supervisors in enforcing safe work practices and providing training and guidance for spill response activities.

4.2 SITE SUPERVISORS

Site supervisors are responsible for verifying that spill response personnel have the required training, PPE and required spill response equipment to perform their assigned work tasks. Site

supervisors will oversee spill response activities and will observe operations for unsafe work practices or conditions and immediately correct unsafe situations.

4.3 ALL SPILL RESPONSE EMPLOYEES

All spill response employees are responsible for complying with site health and safety plans and safe work practices for spill response operations.

5.0 SPILL RESPONSE

Spill response requirements for ITSI projects will be addressed in each SSHP. Each project site will have specific spill response requirements and these will be communicated to site workers in the pre-job site specific health and safety meeting. These spill response requirements will address spill control, spill containment, and spill clean up procedures and will include required PPE/ equipment needed. ITSI spill response is for ITSI projects and project sites only.

In general, spill response will be performed as follows:

5.1 SECURING THE AFFECTED AREA

The first step in spill response is to secure the affected area. This is especially important when dealing with flammable, corrosive, or toxic materials. Securing the area may include simply placing barricades around the spill area and restricting access to trained and authorized personnel only, or in the case of a severe emergency where civilians in the area may be effected, evacuation may be necessary. In the case of severe emergencies or when the spilled/released material is unidentified, local regulatory agencies and emergency service agencies will be consulted and will lead the response.

5.2 CONTROLLING THE SOURCE

Once the area around the spill is secure the next step is to control the spill by stopping the source. Stopping the source of the spill may include using simple procedures (i.e. shutting off a valve) or specialized equipment (i.e. excavators, bulldozers). Personnel performing spill control must have the appropriate PPE and equipment necessary. ITSI personnel will not engage in any spill control operations involving unknown chemical, biological, or radioactive agents. PPE used by ITSI

personnel for spill control of known materials may include levels D through Level B. SSHPs will be consulted for PPE requirements for spill control operations. As a note to ITSI employees:

The minimum level of personal protection for unknown materials will include level B PPE. Level A PPE is required where a high degree of splash contact or vapor contact is possible from unknown materials or from identified extremely hazardous materials.

5.3 CONTAINING THE SPILL

In conjunction with stopping the source of the spill, the spilled material must be contained. Containing the spill has two main objectives.

1. To prevent or minimize environmental impact (i.e. leaking into nearby rivers, lakes, etc.)
2. To minimize clean up efforts.

Spill containment, like spill control, may be simple or complex depending on the extent, location, and type of spill. Spill containment equipment may include such items as absorbent booms and heavy equipment/bulldozers for creation of earthen-berms. As with spill control, PPE required for spill containment will depend on the type of spill and potential for contact with the material.

5.4 CLEANING UP THE SPILL

The final step in spill response is cleaning up the spilled material. Clean up may require manual techniques (hand shoveling, wiping, etc.), mechanical techniques (excavators, loaders, etc.), or both. Approved (by the DOT and disposal facility) disposal containers will be utilized for collection of spill clean up waste and materials. Containers must be compatible with the waste being generated.

ATTACHMENT 4

CHEMICAL SAFETY FACT SHEETS

NIOSH Pocket Guide to Chemical Hazards

Gasoline		CAS 8006-61-9	
		RTECS LX3300000	
Synonyms & Trade Names Motor fuel, Motor spirits, Natural gasoline, Petrol [Note: A complex mixture of volatile hydrocarbons (paraffins, cycloparaffins & aromatics).]		DOT ID & Guide 1203 128	
Exposure Limits		NIOSH REL: Ca See Appendix A	
		OSHA PEL†: none	
IDLH Ca [N.D.] See: IDLH INDEX		Conversion 1 ppm 2.95 mg/m ³ (approx)	
Physical Description Clear liquid with a characteristic odor.			
MW: 72 (approx)	BP: 102°F	FRZ: ?	Sol: Insoluble
VP: 38-300 mmHg	IP: ?		Sp.Gr(60°F): 0.72-0.76
Fl.P: -45°F	UEL: 7.6%	LEL: 1.4%	
Class IB Flammable Liquid: Fl.P. below 73°F and BP at or above 100°F.			
Incompatibilities & Reactivities Strong oxidizers such as peroxides, nitric acid & perchlorates			
Measurement Methods OSHA PV2028 See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet (flammable) Change: No recommendation Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
READ FIRST Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister/Any appropriate escape-type, self-contained breathing apparatus			
Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact			

Symptoms Irritation eyes, skin, mucous membrane; dermatitis; headache, lassitude (weakness, exhaustion), blurred vision, dizziness, slurred speech, confusion, convulsions; chemical pneumonitis (aspiration liquid); possible liver, kidney damage; [potential occupational carcinogen]

Target Organs Eyes, skin, respiratory system, central nervous system, liver, kidneys

Cancer Site [in animals: liver & kidney cancer]

See also: INTRODUCTION

NIOSH Pocket Guide to Chemical Hazards

Chlorodiphenyl (54% chlorine)		CAS 11097-69-1	
C₆H₃Cl₂C₆H₂Cl₃ (approx)		RTECS <u>TQ1360000</u>	
Synonyms & Trade Names Aroclor® 1254, PCB, Polychlorinated biphenyl		DOT ID & Guide 2315 <u>171</u>	
Exposure Limits		NIOSH REL*: Ca TWA 0.001 mg/m ³ <u>See Appendix A</u> [* Note: The REL also applies to other PCBs.]	
		OSHA PEL: TWA 0.5 mg/m ³ [skin]	
IDLH Ca [5 mg/m ³] See: <u>IDLH INDEX</u>		Conversion	
Physical Description Colorless to pale-yellow, viscous liquid or solid (below 50°F) with a mild, hydrocarbon odor.			
MW: 326 (approx)	BP: 689-734°F	FRZ: 50°F	Sol: Insoluble
VP: 0.00006 mmHg	IP: ?		Sp.Gr(77°F): 1.38
FLP: NA	UEL: NA	LEL: NA	
Nonflammable Liquid, but exposure in a fire results in the formation of a black soot containing PCBs, polychlorinated dibenzofurans, and chlorinated dibenzo-p-dioxins.			
Incompatibilities & Reactivities Strong oxidizers			
Measurement Methods NIOSH <u>5503</u> ; OSHA <u>PV2088</u> See: <u>NMAM</u> or <u>OSHA Methods</u>			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap wash immediately Breathing: Respiratory support Swallow: Medical attention immediately	
READ FIRST			
Respirator Recommendations NIOSH At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted organic vapor canister having a high-efficiency particulate filter/Any appropriate escape-type,			

self-contained breathing apparatus

Exposure Routes inhalation, skin absorption, ingestion, skin and/or eye contact

Symptoms Irritation eyes, chloracne; liver damage; reproductive effects; [potential occupational carcinogen]

Target Organs Skin, eyes, liver, reproductive system

Cancer Site [in animals: tumors of the pituitary gland & liver, leukemia]

See also: INTRODUCTION See ICSC CARD: 0939 See MEDICAL TESTS: 0176

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027



Isobutylene
2-Methylpropene
1,1-Dimethylethylene
 $C_4H_8 / CH_2=C(CH_3)_2$
Molecular mass: 56.1
(cylinder)



ICSC # 1027
CAS # 115-11-7
RTECS # UD0890000
UN # 1055
EC # 601-012-00-4

TYPES OF HAZARD/ EXPOSURE	ACUTE HAZARDS/ SYMPTOMS	PREVENTION	FIRST AID/ FIRE FIGHTING
FIRE	Extremely flammable.	NO open flames, NO sparks, and NO smoking. NO contact with oxidizing materials.	Shut off supply; if not possible and no risk to surroundings, let the fire burn itself out; in other cases extinguish with water spray, powder, carbon dioxide.
EXPLOSION	Gas/air mixtures are explosive. Risk of fire and explosion on contact with oxidants, halogens (see Chemical Dangers).	Closed system, ventilation, explosion-proof electrical equipment and lighting. Prevent build-up of electrostatic charges (e.g., by grounding). Use non-sparking handtools.	In case of fire: keep drums, etc., cool by spraying with water. Combat fire from a sheltered position.
EXPOSURE			
•INHALATION	Dizziness. Drowsiness. Dullness. Nausea. Unconsciousness. Vomiting.	Closed system and ventilation.	Fresh air, rest. Artificial respiration if indicated. Refer for medical attention.
•SKIN	ON CONTACT WITH LIQUID: FROSTBITE.	Cold-insulating gloves.	ON FROSTBITE: rinse with plenty of water, do NOT remove clothes. Refer for medical attention.
•EYES	See Skin.	Face shield or eye protection in combination with breathing protection.	First rinse with plenty of water for several minutes (remove contact lenses if easily possible), then take to a doctor.
•INGESTION		Do not eat, drink, or smoke during work.	
SPILLAGE DISPOSAL		STORAGE	PACKAGING & LABELLING

Evacuate danger area! Consult an expert! Ventilation. Remove all ignition sources. Do NOT wash away into sewer. NEVER direct water jet on liquid. Chemical protection suit including self-contained breathing apparatus.	Fireproof. Separated from incompatible materials (see Chemical Dangers). Cool.	Note: C F+ symbol R: 12 S: 2-9-16-33 UN Hazard Class: 2.1
SEE IMPORTANT INFORMATION ON BACK		
ICSC: 1027 Prepared in the context of cooperation between the International Programme on Chemical Safety & the Commission of the European Communities (C) IPCS CEC 2000. No modifications to the International version have been made except to add the OSHA PELs, NIOSH RELs and NIOSH IDLH values.		

International Chemical Safety Cards

ISOBUTENE

ICSC: 1027

I M P O R T A N T D A T A	PHYSICAL STATE; APPEARANCE: COLOURLESS COMPRESSED LIQUEFIED GAS , WITH CHARACTERISTIC ODOUR.	ROUTES OF EXPOSURE: The substance can be absorbed into the body by inhalation.
	PHYSICAL DANGERS: The gas is heavier than air and may travel along the ground; distant ignition possible, and may accumulate in low ceiling spaces causing deficiency of oxygen. As a result of flow, agitation, etc., electrostatic charges can be generated.	INHALATION RISK: On loss of containment this liquid evaporates very quickly causing supersaturation of the air with serious risk of suffocation when in confined areas.
	CHEMICAL DANGERS: Reacts violently with halogens, oxidants, strong acids causing fire and explosion hazard.	EFFECTS OF SHORT-TERM EXPOSURE: Rapid evaporation of the liquid may cause frostbite. The substance may cause effects on the central nervous system. Exposure at high levels may result in unconsciousness.
	OCCUPATIONAL EXPOSURE LIMITS: TLV not established. MAK not established.	EFFECTS OF LONG-TERM OR REPEATED EXPOSURE:
PHYSICAL PROPERTIES	Boiling point: -6.9°C Melting point: -140.3°C Relative density (water = 1): 0.59 Solubility in water, g/100 ml at 20°C: 0.03 Vapour pressure, kPa at 20°C: 257 Relative vapour density (air = 1): 1.94	Flash point: -76.1°C c.c. Auto-ignition temperature: 465°C Explosive limits, vol% in air: 1.8-9.6 Octanol/water partition coefficient as log Pow: 2.35
ENVIRONMENTAL DATA		
NOTES		
Density of the liquid at boiling point: 0.605 kg/l. High concentrations in the air cause a deficiency of oxygen with the risk of unconsciousness or death. Check oxygen content before entering area. Turn leaking cylinder with the leak up to prevent escape of gas in liquid state.		

Transport Emergency Card: TEC (R)-502
NFPA Code: H 1; F 4; R 0;

ADDITIONAL INFORMATION**ICSC: 1027****ISOBUTENE**

(C) IPCS, CEC, 2000

**IMPORTANT
LEGAL
NOTICE:**

Neither NIOSH, the CEC or the IPCS nor any person acting on behalf of NIOSH, the CEC or the IPCS is responsible for the use which might be made of this information. This card contains the collective views of the IPCS Peer Review Committee and may not reflect in all cases all the detailed requirements included in national legislation on the subject. The user should verify compliance of the cards with the relevant legislation in the country of use. The only modifications made to produce the U.S. version is inclusion of the OSHA PELs, NIOSH RELs and NIOSH IDLH values.

NIOSH Pocket Guide to Chemical Hazards

Hydrogen chloride		CAS 7647-01-0	
HCl		RTECS MW4025000	
Synonyms & Trade Names Anhydrous hydrogen chloride; Aqueous hydrogen chloride (i.e., Hydrochloric acid, Muriatic acid) [Note: Often used in an aqueous solution.]		DOT ID & Guide 1050 125 (anhydrous) 1789 157 (solution)	
Exposure Limits	NIOSH REL: C 5 ppm (7 mg/m ³)		
	OSHA PEL: C 5 ppm (7 mg/m ³)		
IDLH 50 ppm See: 7647010		Conversion 1 ppm = 1.49 mg/m ³	
Physical Description Colorless to slightly yellow gas with a pungent, irritating odor. [Note: Shipped as a liquefied compressed gas.]			
MW: 36.5	BP: -121°F	FRZ: -174°F	Sol(86°F): 67%
VP: 40.5 atm	IP: 12.74 eV	RGasD: 1.27	
FLP: NA	UEL: NA	LEL: NA	
Nonflammable Gas			
Incompatibilities & Reactivities Hydroxides, amines, alkalis, copper, brass, zinc [Note: Hydrochloric acid is highly corrosive to most metals.]			
Measurement Methods NIOSH 7903; OSHA ID174SG See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact (solution)/Frostbite Eyes: Prevent eye contact/Frostbite Wash skin: When contaminated (solution) Remove: When wet or contaminated (solution) Change: No recommendation Provide: Eyewash (solution), Quick drench (solution), Frostbite		First Aid (See procedures) Eye: Irrigate immediately (solution)/Frostbite Skin: Water flush immediately (solution)/Frostbite Breathing: Respiratory support Swallow: Medical attention immediately (solution)	
READ FIRST			
Respirator Recommendations NIOSH/OSHA Up to 50 ppm: (APF = 10) Any chemical cartridge respirator with cartridge(s) providing protection against the compound of concern*/(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern/(APF = 25) Any powered, air-purifying respirator with cartridge(s) providing protection against the compound of concern*/(APF = 10) Any supplied-air respirator*/(APF = 50) Any self-contained breathing apparatus with a full facepiece			

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted acid gas canister/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion (solution), skin and/or eye contact

Symptoms Irritation nose, throat, larynx; cough, choking; dermatitis; solution: eye, skin burns; liquid: frostbite; in animals: laryngeal spasm; pulmonary edema

Target Organs Eyes, skin, respiratory system

See also: INTRODUCTION See ICSC CARD: 0163 See MEDICAL TESTS: 0116

NIOSH Pocket Guide to Chemical Hazards

Nitric acid		CAS 7697-37-2	
HNO ₃		RTECS QU5775000	
Synonyms & Trade Names Aqua fortis, Engravers acid, Hydrogen nitrate, Red fuming nitric acid (RFNA), White fuming nitric acid (WFNA)		DOT ID & Guide 1760 154 (<=40% acid) 2031 157 (>40% acid) 2032 157 (fuming)	
Exposure Limits	NIOSH REL: TWA 2 ppm (5 mg/m ³) ST 4 ppm (10 mg/m ³)		
	OSHA PEL†: TWA 2 ppm (5 mg/m ³)		
IDLH 25 ppm See: 7697372	Conversion 1 ppm = 2.58 mg/m ³		
Physical Description Colorless, yellow, or red, fuming liquid with an acrid, suffocating odor. [Note: Often used in an aqueous solution. Fuming nitric acid is concentrated nitric acid that contains dissolved nitrogen dioxide.]			
MW: 63.0	BP: 181°F	FRZ: -44°F	Sol: Miscible
VP: 48 mmHg	IP: 11.95 eV		Sp.Gr(77°F): 1.50
FLP: NA	UEL: NA	LEL: NA	
Noncombustible Liquid, but increases the flammability of combustible materials.			
Incompatibilities & Reactivities Combustible materials, metallic powders, hydrogen sulfide, carbides, alcohols [Note: Reacts with water to produce heat. Corrosive to metals.]			
Measurement Methods NIOSH 7903; OSHA ID165SG See: NMAM or OSHA Methods			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: No recommendation Provide: Eyewash (pH<2.5), Quick drench (pH<2.5)		First Aid (See procedures) Eye: Irrigate immediately Skin: Water flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
READ FIRST Respirator Recommendations NIOSH/OSHA Up to 25 ppm: (APF = 25) Any supplied-air respirator operated in a continuous-flow mode*/(APF = 50) Any chemical cartridge respirator with a full facepiece and cartridge(s) providing protection against the compound of concern ⁱ /(APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern ⁱ /(APF = 50) Any			

self-contained breathing apparatus with a full facepiece/(APF = 50) Any supplied-air respirator with a full facepiece

Emergency or planned entry into unknown concentrations or IDLH conditions: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator (gas mask) with a chin-style, front- or back-mounted canister providing protection against the compound of concern⁴/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation eyes, skin, mucous membrane; delayed pulmonary edema, pneumonitis, bronchitis; dental erosion

Target Organs Eyes, skin, respiratory system, teeth

See also: INTRODUCTION See ICSC CARD: 0183 See MEDICAL TESTS: 0158

NIOSH Pocket Guide to Chemical Hazards

Chromic acid and chromates		CAS 1333-82-0 (CrO ₃)	
CrO ₃ (acid)		RTECS <u>GB6650000</u> (CrO ₃)	
Synonyms & Trade Names Chromic acid (CrO ₃): Chromic anhydride, Chromic oxide, Chromium(VI) oxide (1:3), Chromium trioxide Synonyms of chromates (i.e., chromium(VI) compounds) such as zinc chromate vary depending upon the specific compound.		DOT ID & Guide 1755 154 (acid solution) 1463 <u>141</u> (acid, solid)	
Exposure Limits		NIOSH REL (as Cr): Ca TWA 0.001 mg/m ³ <u>See Appendix A</u> <u>See Appendix C</u>	
		OSHA PEL (as CrO ₃): C 0.1 mg/m ³ <u>See Appendix C</u>	
IDLH Ca [15 mg/m ³ {as Cr(VI)}] See: 1333820		Conversion	
Physical Description CrO ₃ : Dark-red, odorless flakes or powder. [Note: Often used in an aqueous solution (H ₂ CrO ₄).]			
MW: 100.0	BP: 482°F (Decomposes)	MLT: 387°F (Decomposes)	Sol: 63%
VP: Very low	IP: NA		Sp.Gr: 2.70 (CrO ₃)
FLP: NA	UEL: NA	LEL: NA	
CrO ₃ : Noncombustible Solid, but will accelerate the burning of combustible materials.			
Incompatibilities & Reactivities Combustible, organic, or other readily oxidizable materials (paper, wood, sulfur, aluminum, plastics, etc.); corrosive to metals			
Measurement Methods NIOSH 7600, 7604; OSHA <u>ID103</u> , <u>ID215</u> , <u>W4001</u> See: <u>NMAM</u> or <u>OSHA Methods</u>			
Personal Protection & Sanitation Skin: Prevent skin contact Eyes: Prevent eye contact Wash skin: When contaminated Remove: When wet or contaminated Change: Daily Provide: Eyewash, Quick drench		First Aid (See procedures) Eye: Irrigate immediately Skin: Soap flush immediately Breathing: Respiratory support Swallow: Medical attention immediately	
READ FIRST			

Respirator Recommendations NIOSH

At concentrations above the NIOSH REL, or where there is no REL, at any detectable concentration: (APF = 10,000) Any self-contained breathing apparatus that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode/(APF = 10,000) Any supplied-air respirator that has a full facepiece and is operated in a pressure-demand or other positive-pressure mode in combination with an auxiliary self-contained positive-pressure breathing apparatus

Escape: (APF = 50) Any air-purifying, full-facepiece respirator with a high-efficiency particulate filter/Any appropriate escape-type, self-contained breathing apparatus

Exposure Routes inhalation, ingestion, skin and/or eye contact

Symptoms Irritation respiratory system; nasal septum perforation; liver, kidney damage; leukocytosis (increased blood leukocytes), leukopenia (reduced blood leukocytes), eosinophilia; eye injury, conjunctivitis; skin ulcer, sensitization dermatitis; [potential occupational carcinogen]

Target Organs Blood, respiratory system, liver, kidneys, eyes, skin

Cancer Site [lung cancer]

See also: INTRODUCTION See ICSC CARD: 1194 See MEDICAL TESTS: 0051

TRANSPORTATION AND DISPOSAL PLAN
Phase III Soil Vapor Extraction Treatability Study at Parcel B
Hunters Point Shipyard, San Francisco, California

Contract Number N68711-02-D-8303
Delivery Order Number CTO 003

Prepared for:

Department of the Navy
Southwest Division, NAVFACENGCOM
BRAC/06B2
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October 2003

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ACRONYMS AND ABBREVIATIONS

BRAC	Base Realignment and Closure
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
HPS	Hunters Point Naval Shipyard
HSP	Health and Safety Plan
IDW	Investigation derived waste
ITSI	Innovative Technical Solutions, Inc.
LUFT	Leaking Underground Fuel Tank
MTBE	Methyl tert-butyl ether
PCB	Polychlorinated biphenyls
POTW	Public Owned Treatment Waste (facility)
PPE	Personal protective equipment
ROD	Record of Decision
SAP	Sampling and Analysis Plan
SVE	Soil Vapor Extraction
TEPH	Total extractable petroleum hydrocarbons
TS	Treatability Study
T&D	Transportation and disposal
VOC	Volatile organic compound

1.0 INTRODUCTION

This plan for the transportation and disposal (T&D) of investigation-derived waste has been prepared to support the Phase III Soil Vapor Extraction (SVE) Treatability Study field activities at Building 123, in Parcel B, Hunters Point Naval Shipyard (HPS) in San Francisco, California. The plan was prepared on behalf of the Naval Facilities Engineering Command, by Innovative Technical Solutions, Inc. (ITSI), under Contract Number N68711-02-D-8303, Delivery Order Number CTO 003. This plan was prepared in compliance with the Work Plan and the Sampling and Analysis Plan (SAP) for the Phase III Soil Vapor Extraction (SVE) Treatability Study (TS) (ITSI, 2003) and is intended to supplement and parallel that document. This T&D Plan will also be implemented in accordance with the site specific project Health and Safety Plan (HSP) (ITSI, 2003).

The objective of this plan is to describe the procedures to be implemented during handling and disposing of investigation derived waste (IDW) in a manner that will meet regulatory requirements while limiting the on-site handling and storage of materials. The IDW will include soil cuttings and decontamination fluids generated during performance of soil sampling activities. In addition, spent granular activated carbon used in the SVE system and the associated fluids will be handled, transported, and either disposed of or regenerated by a specialized subcontractor. For organizational purposes, the discussion of this transportation and disposal plan has been divided into solids and liquids.

Solids – The following materials are defined as solid IDW:

- Soil cuttings removed from boreholes during well installation
- Personal protective equipment (PPE), miscellaneous disposable sampling devices
- Spent granular activated carbon

Liquids – The following materials are defined as liquid IDW:

- Decontamination fluids
- Treatment system fluids (condensate liquids) associated with carbon filter units

2.0 BACKGROUND

In 1991, HPS was designated for closure under the federal Base Realignment and Closure (BRAC) program, with the intent of transferring the property and facilities, parcel by parcel, to the City of San Francisco and, in particular, to the neighboring communities. In addition to Parcel B's primary use housing office and commercial buildings and warehouses, the Navy also conducted industrial activities, including fuel storage and distribution, sandblasting and painting, machining, acid mixing, and metal fabrication.

The Navy is currently conducting remedial actions to address potential impacts from past Parcel B operations, as specified in the SAP. The remedial actions for Parcel B soil involved excavation of soil from areas where concentrations of chemicals of concern exceeded cleanup criteria established in the Record of Decision (ROD). This Phase III SVE TS as a continuation of the previous Phase II study and is intended to evaluate the effectiveness of an expanded SVE system at removing trichloroethene (TCE) and other volatile organic compounds (VOC) from the soil in order to meet the cleanup goals. This T&D plan supports the sampling activities.

3.0 REQUIREMENTS FOR MANAGEMENT OF INVESTIGATION DERIVED WASTE

Investigation-derived waste will consist of solid and liquid waste. Solid waste consisting of PPE, and other miscellaneous waste (i.e. paper towels) from well installation and sampling activities will be placed in garbage bags, sealed, and disposed of in on-site trash receptacles. Soil cuttings and liquid waste consisting of decontamination fluids will be stored in separate 55-gallon drums approved by the U.S. Department of Transportation (DOT) pending analysis. Carbon from SVE vessels will be handled and transported by a specialized subcontractor to an appropriately

permitted disposal/carbon reactivation facility. The condensate liquids anticipated to be generated by the SVE system during operation will be staged in a doubled contained/bermed 1,000-gallon polypropylene tank for transport and disposal by an appropriately licensed transporter to an appropriately permitted disposal facility. It is assumed that the carbon and liquid wastes generated during SVE operation will be disposed of as hazardous wastes. It is anticipated that a one-time characterization of the spent carbon and condensate liquid will be acceptable and used by the respective disposal facilities.

Wastes will be temporarily stored on-site in a selected staging area and labeled as non-hazardous waste for waste characterization, profiling and final off-site disposal. The Navy will provide the appropriate United States Environmental Protection Agency (EPA) identification number, sign all required documentation, and perform other related functions required of a hazardous waste generator. Every effort will be made to remove the IDW generated during well installation activities (soil cuttings and decontamination liquids) and the SVE system condensate liquids from the site within 90 days of generation.

4.0 METHODOLOGIES FOR MANAGEMENT OF INVESTIGATION DERIVED WASTE

This section presents the methodologies for management and disposal of IDW. The following standard practices will be followed:

- Solid IDW (with the exception of soil cuttings and carbon) will be placed in garbage bags, sealed, and disposed of in on-site trash receptacles.
- Solid IDW consisting of soil cuttings will be placed into UN approved 55-gallon drums.
- Solid IDW consisting of spent carbon will be handled by a specialized subcontractor; ITSI personnel will not handle the waste carbon.
- Liquid IDW consisting of decontamination fluids will be placed into UN approved 55-gallon drums.
- Liquid IDW consisting of treatment system vessel fluids will be contained in a double contained/bermed poly tank and labeled with the date of first accumulation. The liquid will be transported and disposed of by a specialized subcontractor.

- UN approved drums containing solid or liquid waste will be temporarily labeled as non-hazardous waste and stored on-site pending waste characterization, profiling and final off-site disposal.
- The generation, management, characterization, and disposal of IDW will be documented.

4.1 SOLID INVESTIGATION DERIVED WASTE GENERATION AND HANDLING

Solid IDW to be handled by ITSI personnel will primarily consist of soil removed from well boreholes and used and discarded PPE accumulated during field activities. Soil cuttings will be placed into DOT-rated steel drums. Off-site disposal of the soil will depend on the results of analysis of representative grab samples collected at the end of the sampling event, as required by an appropriate licensed off-site Treatment Storage and Disposal Facility. Off-site disposal of soil drums will be in accordance with all appropriate state and federal regulations. Used PPE may include Tyvek™ over-garments, latex gloves, tape, paper towels, plastic sheeting, and plastic packaging. These materials will be collected in a plastic trash bag at each field sampling location. The filled bags will be stored in a designated general refuse container or receptacle at the site and disposed of as municipal waste.

4.2 LIQUID INVESTIGATION DERIVED WASTE GENERATION AND HANDLING

Liquid IDW to be handled by ITSI personnel will primarily consist of decontamination liquid generated during well and piping installation and be placed into UN-rated 55-gallon steel drums. Off-site disposal of the decontamination liquids will depend on the results of waste characterization. Condensate liquid will be staged directly into the double contained/bermed poly tank via piping connecting the tank to the SVE system and will not be directly handled by ITSI personnel. The condensate liquid will be removed from the poly tank by an appropriately licensed transporter for transportation to an off site disposal/recycling facility, pending results of waste characterization.

4.3 INVESTIGATION DERIVED WASTE PROFILING FOR OFF-SITE DISPOSAL

Profiling of the containerized IDW will be necessary for waste acceptance by a receiving facility. A representative sample will be collected from solid and liquid IDW stored in each drum using a small clean trowel for soil (a well-mixed, composited sample will be collected from several areas within the drum) and a clean disposable bailer for wastewater. Samples will be transferred into certified clean containers provided by the laboratory. Sample containers will then be labeled, placed in an ice-chilled cooler, and transported under chain-of-custody procedures to a California-certified analytical laboratory.

Analytical criteria will be dependent on the requirements of the receiving facility, but may include the following typical analytes:

- Total extractable petroleum hydrocarbons (TEPH)
- Volatile Organic Compounds (VOC) including methyl tert-butyl ether (MTBE)
- Polychlorinated biphenyls (PCB)
- Leaking Underground Fuel Tank (LUFT) 5 metals

Additional tests, including any tests specifically required by the sampling program, may be performed based on the results of the above tests and discussions with the receiving facilities.

With the results of the waste characterization analysis, the IDW will be properly profiled and disposal will be coordinated with a Navy-approved and California State-permitted disposal facility. The facility will then issue a letter of waste acceptance for each waste stream as indicated by the waste characterization. The IDW will then be loaded (if stored in drums) or transferred into a vacuum truck (if contained in the poly tank) and transported to the approved facility.

5.0 REFERENCES

Innovative Technical Solutions, Inc. (ITSI), 2003. Draft Workplan Phase III Soil Vapor Extraction Treatability Study, Parcel B, Hunters Point Shipyard, San Francisco, California, May.

IT Corporation (IT), 2002. "Phase II Soil Vapor Extraction Treatability Study Report, Building 123, IR-10, Parcel B, Hunters Point Shipyard, San Francisco, California," February 14.

TtEMI, 2003. "Internal Final Soil Vapor Extraction Confirmation Study, Building 123, Installation Restoration Site 10, Parcel B, Hunters Point Shipyard, San Francisco, California." April 10.

DATA MANAGEMENT PLAN

Phase III Soil Vapor Extraction Treatability Study at Parcel B Hunters Point Shipyard, San Francisco, California

**Contract Number N68711-02-D-8303
Delivery Order Number CTO 003**

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TABLES

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Table 2	2003 Parcel B Phase III Soil Vapor Extraction Treatability Study
Table 3	2003 Parcel B Phase III Soil Vapor Extraction Treatability Study Data Tracking Log

FIGURE

Figure 1	Data Management Flow Chart
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ACRONYMS AND ABBREVIATIONS

CAR	Corrective Action Request
CAS	Chemical Abstract Service
C&T	Curtis and Tompkins Laboratory
DMP	Data Management Plan
DVR	Data Validation Reports
EDD	Electronic data deliverable
EMAC	Environmental Multiple Award Contracts
EPA	United States Environmental Protection Agency
HPS	Hunters Point Shipyard
HSP	Health and Safety Plan
ITSI	Innovative Technical Solutions, Inc.
LDC	Laboratory Data Consultants, Inc.
NEDD	Navy Environmental Data Deliverable
NEDTS	Navy Environmental Data Transfer Standard
SAP	Sampling and Analysis Plan
SDG	Sample Delivery Group
SVE	Soil Vapor Extraction
TS	Treatability Study
VOC	Volatile organic compound

1.0 INTRODUCTION

This Data Management Plan (DMP) is one of the planning documents that will be used by Innovative Technical Solutions, Inc. (ITSI) to conduct the Parcel B Phase III Soil Vapor Extraction (SVE) Treatability Study (TS) at the Hunters Point Shipyard (HPS), in San Francisco, California. The work will be conducted under the Navy's Northern California Environmental Multiple Award Contracts. (EMAC), Contract Number N68711-02-D-8303, Delivery Order CTO 003.

This DMP describes the procedures for managing data generated during implementation of the Sampling and Analysis Plan (SAP) for the Phase III SVE TS (ITSI, 2003) and is intended to supplement and parallel that document. This DMP will also be implemented in accordance with the project Health and Safety Plan (HSP) (ITSI, 2003). A copy of the referenced plans will be maintained in the ITSI Field Trailer for use by the field sampling crew.

2.0 DATA PATH

The data path begins before deployment in the field and ends at the time a final submittal has been sent to the Navy. The data path includes field personnel, laboratory personnel, data management staff, data validators, as well as the preparers of the electronic data deliverable (EDD). Three different companies are also involved with the data path: ITSI, its prime laboratory (Curtis and Tompkins Laboratory [C&T]), the third party data validators (Laboratory Data Consultants [LDC]), and the preparers of the EDD (Synectics, Inc.). A graphical outline of the anticipated data path is presented in Figure 1.

Three tables have been prepared as part of this DMP. Table 1 provides a list of the specific chemical compounds that will be analyzed along with their project-required reporting limits. Table 2 summarizes the proposed sampling program, and also includes assignments for field quality control samples. Table 3 is a sample tracking log listing anticipated borings, samples, and analyses entered into the appropriate fields. All three tables are relevant to and part of the data path.

ITSI recognizes that the format for the Navy Environmental Data Deliverable (NEDD) is changing. If the newer NEDD standard requirements are available, ITSI will use those standards. Otherwise, the electronic deliverable shall conform to the Navy Environmental Data Transfer Standard (NEDTS) version 2.01.

2.1 DATA MANAGEMENT: PREPLANNING

A preliminary meeting will be held with the field personnel by the project manager and project chemist prior to deployment. Tables 2 and 3 will be presented, and may be modified upon suggestions and recommendations from the field personnel.

The full analyte list is included in Table 1 and will be provided to the analytical laboratory. This is intended to avoid confusion at the analytical laboratory since divergent analytical lists are possible. Although the method and classes of compounds (e.g., volatile organic compounds [VOC] by United States Environmental Protection Agency [EPA] SW-846 Method 8260B) are consistent between different laboratories, individual compound lists may have some degree of variability. Standardized chemical names (known as "valid values") along with the Chemical Abstract Service's identifier (or CAS number) for each analyte have been included in Table 1. Table 1 will be used by the analytical laboratory so that the resultant laboratory EDDs shall conform to the requirements of the Navy database.

Table 1 shall be forwarded to LDC, the data validators for review prior to sampling. Any foreseeable potential problems (for example, the use of a dash "-" instead of an underscore "_" in the laboratory data system) that may occur in the preparation of the EDD will be identified and corrected. If a valid value for a chemical needs to be established for the project, the project chemist will request one as appropriate.

2.2 DATA MANAGEMENT: SAMPLING

Unique sample identification numbers will be assigned to all samples in the field in accordance with the procedures detailed in Section 2.3.1 of the SAP. A copy of the project chain of custody forms shall be forwarded by the field personnel to the ITSI Walnut Creek Office, where the project chemist or their designee shall enter the sampling information into the project tracking log (Table 2). The correct type of analysis, sample numbering convention, and other information on the chain of custody shall be crosschecked to ensure that field sampling procedures were followed and corrected, if necessary. Minor

corrections may be made directly. Major, systematic problems shall be documented and corrected through the use of a corrective action request (CAR) form (provided in Attachment 1 of the SAP).

ITSI will prepare a table with survey information that details coordinates for all newly-installed well locations in the NEDTS 2.01 format. This table will be forwarded to Synectics for inclusion in the final NEDTS 2.01 deliverable.

2.3 LABORATORY RECEIPT AND ANALYSIS

Upon receipt of the samples by the laboratory, a completed chain of custody and laboratory receipt form shall be forwarded to the project chemist or designee and cross checked to the project tracking log. Transcription errors and any minor differences will be resolved and documented through the use of email correspondence. Major problems will be documented through the use of a CAR form (provided in Attachment 1 to the SAP).

3.0 PREPARATION OF NEDTS 2.01 DELIVERABLES

Upon completion of the receipt of the last sample results for the sampling event, a copy of the tracking log will be forwarded to LDC for organization purposes. Any potential problems that may occur in the preparation of the EDD that are identified at this stage will be corrected.

As laboratory data packages are prepared, all laboratory packages will be submitted to ITSI for tracking and then to LDC for further processing.

3.1 DATA VALIDATION

LDC will serve as the independent data validation firm, and shall receive individual EDDs directly from the laboratory for all project sample delivery groups. LDC will independently perform data validation in accordance with the requirements of the SAP to ensure that the data collected are valid. Any results that are determined to be invalid will be qualified as "rejected". The data qualifiers assigned by LDC shall be provided to ITSI and Synectics. A list of the qualifiers that have been changed as a result of data validation shall also be provided.

The portion of laboratory data that will not undergo full data validation will also be reviewed by LDC in accordance with the SAP requirements. As a result of this review, a table with a complete listing of all qualifiers that may be applied to the laboratory data will be prepared. Written documentation of the data validation and data review processes will be provided by LDC and included in the final report.

Based on a thorough review of the project objectives, sampling procedures, sampling results, and the raw and validated data, ITSI will provide, as part of the final report, a determination of the relevancy of the collected data for use in decision making.

3.2 PREPARATION OF FINAL SUBMITTAL

LDC will provide to ITSI and Synectics the qualifiers applied to the laboratory data from its data validation effort and data review. The survey information will be matched to the appropriate well location by Synectics, and the EDD shall be finalized. This EDD will be submitted back to ITSI for inclusion in the report, and subsequently submitted to the Navy (and to other contractors, as requested by the Navy).

3.3 STANDARD RECORD KEEPING PROCEDURES

Standard record keeping procedures shall be followed whenever impacts to the data are possible. Copies of pertinent email correspondence, qualified data, corrective action reports (if any), chains of custody, etc. shall be included with the final report.

3.4 DOCUMENT CONTROL SYSTEM

Each submittal of samples to the laboratory will be assigned a sample delivery group (SDG) for sample tracking purposes. This SDG number will be used to track the laboratory data report and data validation reports (DVR) associated with that specific laboratory report. All SDGs and DVRs are tracked in the data tracking log.

The report, project updates, and other correspondence shall reference contract number N68711-02-D-8303, Delivery Order Number CTO 003.

4.0 DATA LOSS PREVENTION

All data shall be copied and managed on the ITSI network server. This server is equipped with redundant disks on a RAID 1, or equivalent system, with daily backup to a secondary server and weekly scheduled backups to external magnetic tape. The server is on an internal network and protected by a firewall. Automatic virus scanning is conducted on a weekly basis, using software that is updated weekly for new viruses.

The laboratory will retain copies of the laboratory data reports and raw data for a period not to be less than 10 years. Transmitted laboratory data reports and data validation reports shall be stored directly to the ITSI network server. Daily logs shall be scanned into Adobe Acrobat document format and stored on the ITSI network server. Correspondence, project plans, etc. shall also be exported as text files and stored to the network server. All data (electronic and hardcopy) will be transmitted to the Navy at the end of the sampling event.

5.0 CORRECTIVE ACTIONS

Corrective actions shall be documented through the use of the CAR form (Attachment 1 to the SAP). The person who discovered the action or item to be corrected is responsible for initiating the report. CARs shall be assigned numbers sequentially starting at 1 for this project. Each CAR shall document the nature and impact of the nonconformance, the action(s) taken to mitigate the non-conformance, and the acceptance of this action by the project manager and quality control manager.

6.0 REFERENCES

- Innovative Technical Solutions, Inc. (ITSI), 2003. Draft Workplan Phase III Soil Vapor Extraction Treatability Study, Parcel B, Hunters Point Shipyard, San Francisco, California, May.
- IT Corporation (IT), 2002. "Phase II Soil Vapor Extraction Treatability Study Report, Building 123, IR-10, Parcel B, Hunters Point Shipyard, San Francisco, California," February 14.
- TtEMI, 2003. "Internal Final Soil Vapor Extraction Confirmation Study, Building 123, Installation Restoration Site 10, Parcel B, Hunters Point Shipyard, San Francisco, California." April 10.

TABLE 1
Hunters Point Naval Shipyard
Parcel B Soil Vapor Extraction Treatability Study
Analyte List
September 2003

Common Name and Analysis Type	Soil				Soil Gas				CAS number	NEDTS 2.01 Name
	Reporting Limit ug/kg	Method Detection Limit ug/kg	Soil PRRL* (ug/kg)	Industrial Soil PRG* (ug/kg)	Reporting Limit (ppbv)	Method Detection Limit (ppbv)	Soil Gas PRRL* (ppbv)	Ambient Air PRG* (ug/m³)		
VOCs (EPA 8260B or EPA TO-15)										
1,1,1,2-Tetrachloroethane	5	0.34	---	---	---	---	---	---	630-20-6	1,1,1,2-TETRACHLOROETHANE
1,1,1-Trichloroethane*	5	0.23	5	1,400,000	0.5	0.16	0.5	1,000	71-55-6	1,1,1-TRICHLOROETHANE
1,1,2,2-Tetrachloroethane*	10	0.24	5	900	0.5	0.17	0.5	0.033	79-34-5	1,1,2,2-TETRACHLOROETHANE
1,1,2-Trichloro-1,2,2-Trifluoroethane	10	0.31	---	---	---	---	---	---	76-13-1	1,1,2-TRICHLORO-1,2,2-TRIFLUOROETHANE
1,1,2-Trichloroethane*	10	0.11	5	1,900	0.5	0.18	0.5	0.12	79-00-5	1,1,2-TRICHLOROETHANE
1,1-Dichloroethane*	10	0.21	5	7,100	0.5	0.12	0.5	520	75-34-3	1,1-DICHLOROETHANE
1,1-Dichloroethene*	10	0.32	5	120	0.5	0.18	0.5	0.038	75-35-4	1,1-DICHLOROETHENE
1,1-Dichloropropene	5	0.33	---	---	---	---	---	---	563-58-6	1,1-DICHLOROPROPENE
1,2,3-Trichlorobenzene	5	0.58	---	---	---	---	---	---	87-61-6	1,2,3-TRICHLOROBENZENE
1,2,3-Trichloropropane	5	0.39	---	---	---	---	---	---	96-18-4	1,2,3-TRICHLOROPROPANE
1,2,4-Trichlorobenzene	5	0.66	---	---	---	---	---	---	120-82-1	1,2,4-TRICHLOROBENZENE
1,2,4-Trimethylbenzene	5	0.71	---	---	---	---	---	---	95-63-6	1,2,4-TRIMETHYLBENZENE
1,2-Dibromo-3-Chloropropane	10	0.59	---	---	---	---	---	---	96-12-8	1,2-DIBROMO-3-CHLOROPROPANE
1,2-Dibromoethane	10	0.20	---	---	---	---	---	---	106-93-4	1,2-DIBROMOETHANE
1,2-Dichlorobenzene	10	0.50	---	---	---	---	---	---	95-50-1	1,2-DICHLOROBENZENE
1,2-Dichloroethane*	10	0.19	5	150,000	0.5	0.12	0.5	37	107-06-2	1,2-DICHLOROETHANE
1,2-Dichloropropane	10	0.26	---	---	---	---	---	---	78-87-5	1,2-DICHLOROPROPANE
1,3,5-Trimethylbenzene	5	0.63	---	---	---	---	---	---	108-67-8	1,3,5-TRIMETHYLBENZENE
1,3-Dichlorobenzene	10	0.57	---	---	---	---	---	---	541-73-1	1,3-DICHLOROBENZENE
1,3-Dichloropropane	5	0.13	---	---	---	---	---	---	142-28-9	1,3-DICHLOROPROPANE
1,4-Dichlorobenzene	10	0.62	---	---	---	---	---	---	106-46-7	1,4-DICHLOROBENZENE
2,2-Dichloropropane	5	0.30	---	---	---	---	---	---	594-20-7	2,2-DICHLOROPROPANE
2-Butanone	10	0.45	---	---	---	---	---	---	78-93-3	2-BUTANONE
2-Chlorotoluene	5	0.66	---	---	---	---	---	---	95-49-8	2-CHLOROTOLUENE
2-Hexanone	10	0.29	---	---	---	---	---	---	591-78-6	2-HEXANONE
4-Chlorotoluene	3	0.56	---	---	---	---	---	---	106-43-4	4-CHLOROTOLUENE
4-Methyl-2-Pentanone	10	0.46	---	---	---	---	---	---	108-10-1	4-METHYL-2-PENTANONE
Acetone	20	1.2	---	---	---	---	---	---	67-64-1	ACETONE
Benzene	5	0.31	---	---	---	---	---	---	71-43-2	BENZENE
Bromobenzene	5	0.37	---	---	---	---	---	---	108-86-1	BROMOBENZENE
Bromochloromethane	10	0.17	---	---	---	---	---	---	74-97-5	BROMOCHLOROMETHANE
Bromodichloromethane	5	0.34	---	---	---	---	---	---	75-27-4	BROMODICHLOROMETHANE
Bromoform	5	0.17	---	---	---	---	---	---	75-25-2	BROMOFORM
Bromomethane	10	0.3	---	---	---	---	---	---	74-83-9	BROMOMETHANE
Carbon Disulfide	5	0.51	---	---	---	---	---	---	75-15-0	CARBON DISULFIDE
Carbon Tetrachloride*	5	0.26	5	530	0.5	0.16	0.5	0.13	56-23-5	CARBON TETRACHLORIDE
Chlorobenzene	5	0.34	---	---	---	---	---	---	108-90-7	CHLOROBENZENE
Chloroethane*	10	0.59	5	6,500	0.5	0.31	0.5	2.3	75-00-3	CHLOROETHANE
Chloroform*	5	0.19	5	520	0.5	0.12	0.5	0.084	67-66-3	CHLOROFORM
Chloromethane	10	0.58	---	---	---	---	---	---	74-87-3	CHLOROMETHANE
Cis-1,2-Dichloroethene*	5	0.21	5	150,000	0.5	0.14	0.5	37	156-59-2	cis-1,2-DICHLOROETHENE
Cis-1,3-Dichloropropene	5	0.16	---	---	---	---	---	---	10061-01-5	cis-1,3-DICHLOROPROPENE
Dibromochloromethane	5	0.06	---	---	---	---	---	---	124-48-1	DIBROMOCHLOROMETHANE
Dibromomethane	5	0.20	---	---	---	---	---	---	74-95-3	DIBROMOMETHANE

TABLE 1
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Parcel B Soil Vapor Extraction Treatability Study
Analyte List
 September 2003

Common Name and Analysis Type	Soil				Soil Gas				CAS number	NEDTS 2.01 Name
	Reporting Limit ug/kg	Method Detection Limit ug/kg	Soil PRRL* (ug/kg)	Industrial Soil PRG* (ug/kg)	Reporting Limit (ppbv)	Method Detection Limit (ppbv)	Soil Gas PRRL* (ppbv)	Ambient Air PRG* (ug/m ³)		
Dichlorodifluoromethane	10	0.45	---	---	---	---	---	---	75-71-8	DICHLORODIFLUOROMETHANE
Ethylbenzene	5	0.42	---	---	---	---	---	---	100-41-4	ETHYL BENZENE
Hexachlorobutadiene	5	0.76	---	---	---	---	---	---	87-68-3	HEXACHLOROBUTADIENE
Isopropylbenzene	5	0.69	---	---	---	---	---	---	98-82-8	ISOPROPYLBENZENE
Methylene Chloride*	20	0.97	5	2,100	0.5	0.14	0.5	4.1	75-09-2	METHYLENE CHLORIDE
N-Butylbenzene	5	0.66	---	---	---	---	---	---	104-51-8	N-BUTYLBENZENE
Naphthalene	5	0.50	---	---	---	---	---	---	91-20-3	NAPHTHALENE
p-Isopropyl Toluene	5	0.57	---	---	---	---	---	---	99-87-6	P-ISOPROPYLTOLUENE
Propylbenzene	5	0.73	---	---	---	---	---	---	103-65-1	N-PROPYLBENZENE
Sec-Butylbenzene	5	0.79	---	---	---	---	---	---	135-98-8	SEC-BUTYLBENZENE
Styrene	5	0.42	---	---	---	---	---	---	100-42-5	STYRENE
Tert-Butyl Methyl Ether	5	0.14	---	---	---	---	---	---	1634-04-4	METHYL tert-BUTYL ETHER
Tert-Butylbenzene	5	0.79	---	---	---	---	---	---	98-06-6	TERT-BUTYLBENZENE
Tetrachloroethene*	5	0.56	5	19,000	0.5	0.19	0.5	3.3	127-18-4	TETRACHLOROETHENE
Toluene	5	0.57	---	---	---	---	---	---	108-88-3	TOLUENE
Trans-1,2-Dichloroethene*	5	0.30	---	---	---	---	---	---	156-60-5	trans-1,2-DICHLOROETHENE
Trans-1,3-Dichloropropene	5	0.22	---	---	---	---	---	---	10061-02-6	trans-1,3-DICHLOROPROPENE
Trichloroethene*	5	0.39	5	6,100	0.5	0.12	0.5	1.1	79-01-6	TRICHLOROETHENE
Trichlorofluoromethane	5	0.35	---	---	---	---	---	---	75-69-4	TRICHLOROFLUOROMETHANE
Vinyl Acetate	50	13	---	---	---	---	---	---	108-05-4	VINYL ACETATE
Vinyl Chloride*	10	0.29	5	830	0.5	0.13	0.5	0.022	75-01-4	VINYL CHLORIDE
Xylene (Total)	5	1.1	---	---	---	---	---	---	NA ^a	XYLENE, (TOTAL)
Soil Properties										
Total Organic Carbon	50000	40000	---	---	---	---	---	---	NA	TOTAL ORGANIC CARBON
Bulk Density (ASTM D2937)	NA	NA	---	---	---	---	---	---	NA	BULK DENSITY
Specific Gravity (ASTM D854)	NA	NA	---	---	---	---	---	---	NA	SPECIFIC GRAVITY
Hydraulic Conductivity (ASTM D5084)	NA	NA	---	---	---	---	---	---	NA	HYDRAULIC CONDUCTIVITY
Moisture Content (ASTM D2216)	NA	NA	---	---	---	---	---	---	NA	MOISTURE

Notes:

* - Project Specific Critical Analytes identified in the Sampling and Analysis Plan for Soil Vapor Extraction Confirmation, IR Site 10, HPS, TtEMI, August 30, 2002.

a - Project-Required Reporting Limits (PRRL) and Preliminary Remediation Goals (PRG) identified for the Project Specific Critical Analytes

b - CAS numbers are assigned to unique compounds, not mixtures. This result is the sum of three compounds of CAS numbers 95-47-6; 108-38-3; and 106-42-3

ug/kg - micrograms per kilogram

ug/m³ - micrograms per cubic meter

ppbv - parts per billion (volume)

TABLE 2
Parcel B Soil Vapor Extraction Treatability Study
Hunters Point Naval Shipyard, Parcel B, San Francisco, California

IR Site 10	Location/Sample	Sample Type	SA CODE	Soil Gas VOC (TO-15)	VOC (EPA 8260B)	Bulk Density ASTM D-2937	Specific Gravity ASTM D-854	Hydrolic Conductivity ASTM D-5084	Moisture ASTM D-2216	Total Organic Carbon (EPA 9060/415.2)
SOW 2.7.1										
(Baseline) Note wells to be selected based on field readings	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	FD	1						
SOW 2.7.2										
(Weekly Influent)	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
(Monthly Influent)	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
SOW 2.7.2										
(Rebound) Note at least one wells to be same as selected from Baseline	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	N	1						
	IR10SG/VM-	Soil Vapor	FD	1						
SOW 2.7.3										
SVE Well Installation (up to 4 sample depths per well to determined in the field)	IR10VW15A	Soil	N		1					
	IR10VW15A	Soil	N		1					
	IR10VW16A	Soil	N		1					
	IR10VW16A	Soil	N		1					
	IR10VW17A	Soil	N		1					
	IR10VW17A	Soil	N		1					

TABLE 2
Parcel B Soil Vapor Extraction Treatability Study
Hunters Point Naval Shipyard, Parcel B, San Francisco, California

IR Site 10	Location/Sample	Sample Type	SA CODE	Soil Gas VOC (TO-15)	VOC (EPA 8260B)	Bulk Density ASTM D-2937	Specific Gravity ASTM D-854	Hydraulic Conductivity ASTM D-5084	Moisture ASTM D-2216	Total Organic Carbon (EPA 8060/415-2)
	IR10VW18A	Soil	N		1					
	IR10VW18A	Soil	N		1					
	IR10VW19A	Soil	N		1					
	IR10VW19A	Soil	N		1					
	IR10VW19A	Soil	FD		1					
	IR10VW20A	Soil	N		1					
	IR10VW20A	Soil	N		1					
	IR10VW21A	Soil	N		1					
	IR10VW21A	Soil	N		1					
	IR10VW22A	Soil	N		1					
	IR10VW22A	Soil	N		1					
	IR10VW23A	Soil	N		1					
	IR10VW23A	Soil	N		1					
	IR10VW23A	Soil	FD		1					
	IR10VW23A	Soil	MS		1					
	Trip Blank #1	Soil	TB		1					
	Trip Blank #2	Soil	TB		1					
	Trip Blank #3	Soil	TB		1					
	Equipment Rinse	Soil	ER		1					1
	Source Water	QC Water	SW		1					1
	IR10VW15A	Soil	N			1	1	1	1	1
	IR10VW15A	Soil	N			1	1	1	1	1
	IR10VW16A	Soil	N			1	1	1	1	1
	IR10VW16A	Soil	N			1	1	1	1	1
	IR10VW17A	Soil	N			1	1	1	1	1
	IR10VW17A	Soil	N			1	1	1	1	1
	IR10VW18A	Soil	N			1	1	1	1	1
	IR10VW18A	Soil	N			1	1	1	1	1
	IR10VW19A	Soil	N			1	1	1	1	1
	IR10VW19A	Soil	N			1	1	1	1	1
	IR10VW19A	Soil	FD							1
	IR10VW20A	Soil	N			1	1	1	1	1
	IR10VW20A	Soil	N			1	1	1	1	1

TABLE 2
Parcel B Soil Vapor Extraction Treatability Study
Hunters Point Naval Shipyard, Parcel B, San Francisco, California

IR Site 10	Location/Sample	Sample Type	SA CODE	Soil Gas VOC (TO-15)	VOC (EPA 8260B)	Bulk Density ASTM D-2937	Specific Gravity ASTM D-854	Hydrolic Conductivity ASTM D-5084	Moisture ASTM D-2216	Total Organic Carbon (EPA 9060/415.2)
	IR10VW21A	Soil	N			1	1	1	1	1
	IR10VW21A	Soil	N			1	1	1	1	1
	IR10VW22A	Soil	N			1	1	1	1	1
	IR10VW22A	Soil	N			1	1	1	1	1
	IR10VW23A	Soil	N			1	1	1	1	1
	IR10VW23A	Soil	N			1	1	1	1	1
	IR10VW23A	Soil	FD							1

N= PRIMARY SAMPLE; FD=FIELD DUPLICATE SAMPLE; MS= MATRIX SPIKE/MATRIX SPIKE DUPLICATE

TB= TRIP BLANK; ER= EQUIPMENT RINSEATE; SW= SOURCE WATER

For Sample Numbering Scheme: IR10= Installation Restoration Site #10; VM= Vapor Monitoring; SG= Soil Gas; S= Soil

SUMMARY ENVIRONMENTAL SAMPLES

Total number of samples	N	19	18	18	18	18	18	18	18
QC SAMPLES									
Field Duplicates	FD	2	2	0	0	0	0	0	2
Matrix Spike/Matrix Spike Duplicate	MS	0	1	0	0	0	0	0	0
Equipment Blanks	ER	0	1	0	0	0	0	0	0
Source Water (provided by Lab)	SW	0	1	0	0	0	0	0	0
Percent of QC									
Field Duplicates		11%	11%	0%	0%	0%	0%	0%	11%
Matrix Spikes/Matrix Spike Duplicates		0%	6%	0%	0%	0%	0%	0%	0%
Equipment Blanks		11%	6%	0%	0%	0%	0%	0%	0%

Total:	21	22	18	18	18	18	18	20
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Notes:

Two equipment blanks are required per week. A duration of one week and one day is anticipated for deployment in the field.

Analysis of equipment blanks and source water will be for the same analyses as the soil samples.

Trip blanks are for the analysis of Method 8260B only.

Matrix spikes are not performed on soil vapor samples and are not applicable for geological parameters



Soil Gas VOC (TC-15)
VOC (EPA 8260B)
Semi-Volatile
Pesticide Residues
Specific Gravity
ASTM D-153
Hydrocarbons
ASTM D-5584
Moisture
ASTM D-2216
Total Organic Carbon (EPA
8000/418-2)
Sample Delivery Group
Date Laboratory Data Report
Received by HTSI
Date Laboratory Data Report
Sent to Third-party Validator
Date Data Validator Report
Received by HTSI

Notes

TABLE 3
2003 PARCEL B SOIL VAPOR EXTRACTION TREATABILITY STUDY
HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CALIFORNIA

2003 PARCEL B SOIL VAPOR EXTRACTION TREATABILITY STUDY HUNTERS POINT NAVAL SHIPYARD, SAN FRANCISCO, CALIFORNIA																	
TABLE 3																	
Soil Gas VOC (TO-16) VOC (EPA 8260B) Bulk Density ASTM D-2937 Specific Gravity ASTM D-454 Hydric Conductivity ASTM D-5694 Moisture ASTM D-2216 Total Organic Carbon (EPA 9000A15.2) Sample Delivery Group Date Laboratory Data Report Received by ITS1 Date Laboratory Data Report Sent to Third-party Validator Date Data Validation Report Received by ITS1																	
IR Site	NEDTS Sample Code	Date Sampled	Sample Time	Sample ID	Field ID	Depth (est)	Date Sample Shipped to Laboratory	Date Sample Received at Laboratory	Requested Analyses								
SB	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
SB	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
SB	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY		X	X	X	X	X		MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
SB	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY		X	X	X	X	X		MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
MS	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
FD	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
MS	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY							X	MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
FD	MM/DD/YYYY	0000	YYWWT###	IR10VW23A	Depth	MM/DD/YYYY	MM/DD/YYYY							X	MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
TB	MM/DD/YYYY	0000	YYWWT###	Trip Blank #1	NA	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
TB	MM/DD/YYYY	0000	YYWWT###	Trip Blank #2	NA	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
TB	MM/DD/YYYY	0000	YYWWT###	Trip Blank #3	NA	MM/DD/YYYY	MM/DD/YYYY	X							MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
ER	MM/DD/YYYY	0000	YYWWT###	Equipment Rinse	NA	MM/DD/YYYY	MM/DD/YYYY	X						X	MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
BWF	MM/DD/YYYY	0000	YYWWT###	Source Water	NA	MM/DD/YYYY	MM/DD/YYYY	X						X	MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
IDW	MM/DD/YYYY	0000	YYWWT###	Invest. Der. Waste	NA	MM/DD/YYYY	MM/DD/YYYY	X						X	MM/DD/YYYY	MM/DD/YYYY	MM/DD/YYYY
Notes																	

Notes: Geotechnical samples will include the Total Organic Carbon (TOC) and be given a separate sample identifier from the VOC samples.

IR = Installation Restoration

NEDTS = Navy Environmental Data Transfer System

ID = identification

est = estimated

VOC = volatile organic compound

ASTM = American Society for Testing and Materials

SG = Soil gas/soil vapor

FD = Duplicate Sample

SB = Soil Boring

ER = Equipment Rinse Sample

ID = Identification

NA = Not applicable

BWF = Blank Water QC sample for Field

EPA = Environmental Protection Agency

MS/MSD=Matrix Spike/Matrix Spike duplicate analysis at 5% of project samples

Sample naming convention: YYWWT###

Where YY is the last two digits of the year

WW is the week of the year

T is the alphanumeric identifier for the sampling team "A" for Team 1, "B" for Team 2, etc.

is the sequential number

PRE-PLANNING

Prepare Planned Sample Table.
(Field)

Prepare Data Tracking Log.
(Office)

SAMPLING

Modify Planned Sample Table as appropriate in the field.

Enter modifications into Data Tracking Log on a daily basis.

Samples submitted to Laboratory for analyses.
(Primary & QA)

Receive copies of Chain-of-Custodies from both field & laboratory, update Data Tracking Log.

POST-SAMPLING

Samples analyzed and Laboratory Report and Electronic Data Deliverable (EDD) completed.

Receive reports and EDDs, update Data Tracking Log.

DATA VALIDATION

Laboratory Report and EDD submitted to third-party data validator for 20% Level IV and 80% Level III data validation.

ITSI submits EDDs to NEDTS 2.01 preparer.

Data validator applies qualifiers direct to EDD and submits data validation reports to ITSI

ITSI confirms application of qualifiers. ITSI adds field information.

NEDTS ELECTRONIC DATA DELIVERABLE PREPARATION

Field Data merged with Lab Data and NEDTS 2.01 prepared.

ITSI updates Data Tracking Log.

FINAL REPORTING

Submit to Navy



**Innovative
Technical
Solutions, Inc.**

Hunters Point Naval Shipyard
Parcel B Soil Vapor Extraction Treatability Study
Data Management Plan
San Francisco, California

FIGURE 1
Data Management Flow Chart